Royal Australian Artillery Historical Company

Glossary

Colonial Artillery

Artillery Today

World War 1

World War 11

Vietnam War

AUSTRALIA
Did you Know

ROYAL AUSTRALIAN ARTILLERY GLOSSARY

The following are glossaries, past and present, related of the Royal Regiment of Australian Artillery.

A

Accuracy

The location of gun positions and targets relative to each other are determined as precisely as time and equipment tolerances will permit. The bearing and distance from the gun to the target is then calculated and firing information to be used by the gun is obtained using firing tables. This information is then corrected to compensate for variations in meteorology, propellant, temperature and muzzle velocity to ensure that the first rounds are placed as close as possible to the target.

Accuracy of Artillery fire will be affected by a number of factors:

* The accuracy of the fixation and orientation of the guns.
* The accuracy of the fixation of the target.
* The accuracy with which the map bearing, map range and angle of sight between the gun and the target are calculated.
* The accuracy of the corrections applied to the map data to compensate for any non-standard conditions.
* The accuracy of sight tests and laying.
* The care taken when sorting ammunition into groups of the same lot/batch number.
* The care taken when storing ammunition with a view to maintaining uniformity of charge temperature.
* With regard to separate loading ammunition; the uniformity with which the projectiles are rammed during loading.

Add

A correction used by an observer to indicate that an increase in range along the observer-to- target line (Line OT) is required (see: *Forward Observer and Line Observer-to-Target*).

Adjustment

The procedure of engaging a target by observed artillery fire. The fire is adjusted (for line and range) until it falls near to the target. The fire is normally adjusted by the firing of one gun.

Adjutant

In Artillery the adjutant's additional duties include:

* Being the commanding officer's (CO's) operations officer within the regimental gun area.
* Responsible for both the organization of the regimental command post (RCP) and the implementation of any special orders, policies or control over the fire of the regiment as directed by the commanding officer.
* Authorizing relevant fire missions as required.
* Co-ordinating and controlling the fire for both regimental and

higher formation targets.

* Sub-allotting tasks for fire plans.
* Controlling the reporting of all regimental and higher formation targets.
* The reception, passage and recording of tactical information; including advising the relevant headquarters divisional artillery (HQ Div Arty) of the availability of batteries within the regiment, and the maintenance of a tactical map showing the disposition of both friendly and enemy forces.
* The passage of all counter battery (CB) adjustment reports and other related reports to the artillery intelligence staffs.
* The maintenance of up-to-date records of survey grids within the regiment.

Adopted Muzzle Velocity	A gun's muzzle velocity for a particular charge, determined through wear of the barrel (see: *Muzzle Velocity*).
Advanced Post	A post set-up in front of a sound ranging base whose main task is to start and stop the sound ranging recording equipment.
Advanced Sound Ranging Programme	A portable, passive, acoustic sensing system for detecting and locating the source of artillery fire and loud detonations. Once the system is fully deployed, the microphones at the sensor post are able to detect any acoustic disturbance caused by gunfire. The sensor posts are accurately surveyed-in and are electronically connected to the relevant command post.
Aiming Point	There are two types of aiming points, a battery aiming point and a gun aiming point: * Battery Aiming Point: A point selected by the gun position officer on arrival at a new position and used to ensure all the guns are on a common aligned bearing to the gun position's 'centre of arc' (see: *Centre of Arc*). * Gun Aiming Point: A point selected by the detachment commander, for his gun, after his gun has been laid in the battery's 'centre of arc'. All bearing applied to a gun during a fire mission are set onto the gun's dial sight and the gun is then traversed until the sight is realigned with the relevant aiming point; the gun's barrel is then 'pointing' to the target (see: *Dial Sight*). There are normally three types of points; distant distinctive topographical features, aiming posts (see: *Aiming Posts*) and parallelescopes (see: *Parallelescope*).
Aiming Posts	Two posts which are placed in-line from the gun's dial sight at approximately 50 and 100 metres from the gun. When a bearing is applied to the sight, during a fire mission, the sight moves off the posts, the gun is then traversed until the sight is realigned with the posts; the gun's barrel is then 'pointing' to the target.
Air Burst	Artillery fire in which the projectile is caused to burst in the air, so that fragments of the shell are driven-down and hit the target area that a direct attack would not reach. The accepted height of burst above the target being 20 metres.
Air Burst Ranging	Airburst fire may be used to verify the accuracy of a gun or to

	determine any necessary corrections that may be needed due to meteorological conditions. With the use of survey equipment the exact point of burst may be determined and compared with the expected point of burst, thereby allowing the necessary corrections to be made to the gun's data.
Air Clearance	A procedure required to ensure that the relevant flight path of a friendly aircraft does not cross the trajectory of the projectile or pass near to its point of burst (see: *Trajectory*).
Air Defence Action Area	An area and it's airspace within which friendly aircraft or surface-to-air weapons are normally given precedence in operations, except under specified conditions.
Air Defence Area	A specifically defined airspace for which defence must be planned and provided.
Air Defence Liaison Officer	A representative of the deployed air defence asset who is employed in the brigade, division and/or joint force headquarters to provide specialist advice to other battle operating system (BOS) liaison officers and service representatives. His tasks may include: * Liaising with all airspace users, including Air Force, Navy, Army surveillance and target acquisition, and Army Aviation, on Ground Based Air Defence (GBAD) control aspects as they affect the regiment. * Establishing and maintaining links robust enough to ensure the highest levels of control. * Coordinating the activities of the GBAD controllers of the regiment. * Liaising and coordinating all control aspects. * Acting as a GBAD controller in the Joint Force Air Operations Centre (JFAOC) when required. * Representing the commanding officer at the formation headquarters if he is unavailable. (see: *Ground Based Air Defence*).
Air Ground Operations Battery	The Battery provides command and control for joint air-land integration and the control of Close Air Support in order to support Australian Defence Force operations.
Air Land Integration	Air Land Integration is the coordination of joint fires, and friendly ground and air assets to permit timely and accurate engagement of enemy targets and reduce fratricide.
Air Observer	An Artillery observation officer operating from a light aircraft. During both the Second World War and the Korean War, and up until the early 1960s, air observation post pilots were, in the main, Artillery officers who had been trained to fly aircraft. Today Australian Army Aviation Corps pilots are trained to direct Artillery fire.
Air Observation Post	(see: *Air Observer*)
Air Portability Team Leader	A unit NCO who assists the unit's emplaning officer (UEO) in planning the layout of the unit's equipment and stores for

	transportation within a service transport aircraft (see: *Unit Emplaning Officer*).
Air Warning Control Centre	Established in a Regional Observation Centre (ROC) and working in conjunction with the RAAF Air Defenders, the Air Warning Control Centre (AWCC) manages the long range airspace beyond the area of interest and issues airborne early warning control orders to the division, brigade, and/or joint force headquarters as the air threat escalates or de-escalates.
Airborne Early Warning & Control	Control measures which are generated from the Air Warning Control Centre to increase, or decrease, the ground based air defence weapon systems' state of readiness. There are four states: * State 0: An attack is imminent. * State 1: An attack is probable. * State 2: An attack is unlikely. * Released until … Hours: The detachment will not be called upon to engage a threat before the specified time. There are also four weapon control orders: * Weapons Tight: Not to engage unless positively identified as hostile. * Weapons Free: Engage any target not positively identified as a friendly. * Weapons Hold / Safe: Not to engage any target unless in self-defence or in defence of a protected target. * Hold Fire: Not to engage.
Altitude	The altitude of a target (based on the sea level).
Altitude Corrections	Corrections that are made when there is an appreciable difference in altitude, between the gun and the target. It is applied to the gun-to-target map range and compensates the non-rigidity to the trajectory (see: *Non-rigidity* and *Trajectory*).
Ammunition	(see: *Fixed Ammunition*, *Semi-Fixed Ammunition*, *Separate Loading Ammunition*, *Separated Ammunition* and *Line Ammunition*)
Ammunition Control Point	An Artillery area/position where a unit positions its ammunition; usually controlled by the regimental sergeant-major.
Ammunition Point	An area/position within a sub-unit's area where the ammunition and produce (eg. used cartridge cases) are stored.
Ammunition State	A report which lists the amounts and types of ammunition both issued and expended since the previous report by the unit, and the amounts remaining (sometimes referred to as an 'Ammunition Return' and during the Vietnam War its 'code word' was "Excalibur").
Angle of Arrival	(see: *Ballistic Angles*)
Angle of Departure	(see: *Ballistic Angles*)

Angle of Descent	(see: *Ballistic Angles*)
Angle of Impact	(see: *Ballistic Angles*)
Angle of Incidence	(see: *Ballistic Angles*)
Angle of Projection	(see: *Ballistic Angles*)
Angle of Sight	(see: *Ballistic Angles*)
Appointment Title	A title used when transmitting over radios to designate a specific appointment. Examples: * Sunray: The commander of a unit/party (eg. CO / BC / FO). * Sunray Minor: The second-in-command (eg. unit 2IC / BK). * Seagull: The command post officer (GPO). * Manhole: The RSM / BSM. * Pronto: The signals officer / signals NCO. * Bluebell: The senior Royal Australian Electrical and Mechanical Engineer (RAEME) person on location (ie. officer, warrant officer or NCO) (see: *Royal Australian Electrical and Mechanical Engineers*).
Approach Angle	A horizontal angle between the line of sight and the path of the target. Used in anti-tank gunnery (the path of the target and the line of sight are assumed to be in the horizontal plane).
Area of Operations	The portion of an area of war necessary for military operations, either offensive or defensive, pursuant to an assigned mission, and for the administration incidental to such operations.
Area of Responsibility	A defined area of land in which responsibility is specifically assigned to the commander of the area for the development and maintenance of installations, control of movement and the conduct of tactical operations involving troops under his control along with parallel authority to exercise these functions.
Armour Piercing	A high explosive or kinetic energy solid shot used against armoured fighting vehicles.
Artillery Command Systems Operator	(see: *Operator Command Post*)
Artificer Sergeant-Major	The Royal Australian Electrical and Mechanical Engineers (RAEME) senior warrant officer in an artillery unit's workshop (see: *Royal Australian Electrical and Mechanical Engineers*).
Artillery Command Systems Operator	(see: *Operator Command Post*)
Artillery Intelligence	The aims of the Artillery Intelligence are: * To provide target acquisition data on the enemy's artillery (see: *Target Acquisition*). * To neutralize or destroy the enemy's artillery in accordance with the commander's counter battery policy (see: *Counter Battery*).

	* To provide for the G Staff (Intelligence Staff) intelligence deduced from any information gathered about the enemy artillery.
Artillery Tactical Headquarters	The Artillery commanding officer's headquarters made-up of signallers and operators command post from the regiment's headquarters battery, and commanded by the battery's commander. It accompanies the commanding officer at the brigade headquarters and provides the regiment with the necessary relevant tactical information (also referred to as: 'Arty-Tac').
Assistant Command Post Officer	A person who temporarily relieves and takes-up the duties of the gun position officer within the command post (eg. a section commander, the BSM, the BG, the operator command post sergeant). This normally occurs during the night.
Assistant Instructor-in-Gunnery	A term used up until early-1982, to identify a warrant officer class 2 (WO2) artillery instructor (often referred to as an 'Ack IG') (see: *Sergeant-Major Instructor-in-Gunnery*).
At My Command	The command used by an authorized call sign (eg. forward observer) when controlling the exact time of firing of the requested artillery fire (ie. the guns, when ready to fire, do not do so until ordered by the relevant call sign). The order is cancelled by the order 'Cancel at my command' or the call for a new fire mission.
Authorized Observer	An artillery observer (officer) who is authorized to order fire from other specific fire units, in addition to his own unit, for the engagement of any relevant target he needs to engage (normally the authorization is given for a particular operation, or phase of an operation). He may give the necessary fire orders directly to the units without reference to any higher authority. The authorization is granted by the regiment's commanding officer, however, it may also be granted, on the commanding officer's behalf, by the regimental command post (ie. the adjutant).
Azimuth	The horizontal angle measured clockwise from a fixed reference to another point.

B

Bad Ram	If a projectile is loaded into the breech with insufficient force to engage it correctly into the rifling it will not allow the full pressure of the propellant to build up when fired and this would cause the projectile to fall erratically. When it is recognized that the projectile has been badly rammed it is ejected; however, if it cannot be ejected the detachment commander reports “Bad Ram” and the GPO then passes the order onto the observer who is then responsible for ordering the projectile to be fired at a safe location.
Ballistics	The science of the motion of a projectile (see: *Internal Ballistics*, *Intermediate Ballistics* and *External Ballistics*).
Ballistic coefficient	The ability of a projectile to overcome air resistance by reason of its mass and shape. Basically, the ballistic coefficient increases with the weight of the projectile, but decreases as the diameter of the projectile increases (eg. a low air density, which occurs at a high altitude, or with a higher air temperature, implies a larger coefficient and consequently better carrying-power of the projectile in flight).
Ballistic Angles	Angles associated with the projectile’s trajectory. Vertical ballistic angles are: * Angle of Departure: The angle between the line of departure (of the projectile from the gun’s muzzle), when the gun is fired, and the horizontal plane (see*: Elevation*). * Angle of Sight: The vertical angle between a gun and the target; it may be one of elevation or depression. * Angle of Projection: The angle for a given point on a projectile’s trajectory between the line of departure and the line of sight. * Angle of Descent: The angle (at a given point on the trajectory) between the line of arrival and the line of sight to the target. * Angle of Arrival: The angle for a given point on the projectile’s trajectory between the line of arrival (to the target) and the horizontal plane. * Angle of Impact: The angle between the line of arrival and the surface of impact, at the point of impact. * Angle of Incidence: The angle, drawn at right angles at the point of impact, between the line of arrival of a projectile and the surface of the target.
Ballistic Point of Graze	The point at which the trajectory intersects the horizontal plane through the trunnions.
Barrage	A moving or stationary line of artillery fire providing a protective screen behind which troops can advance or defend (when moving to support an advance onto the enemy it is referred to as a rolling barrage).

Barrel	A ‘tube’ that houses a complete round and directs the projectile when fired. Rifling on the inner surface of the barrel rotates the projectile (normally clockwise) so as to maintain its direction and to prevent the projectile tumbling in flight.
Base Ejection Shell	A projectile that has its payload ejected from its rear (base) (eg. smoke and illumination projectiles) (see: *Projectile*).
Basic-structure	The gun’s carriage supporting the barrel and includes the wheels, trails, saddle support, and axle (see: *Super- structure*).
Battery	The basic unit of artillery. A ‘fixed’ fortified structures in which artillery pieces were placed (eg. 6 inch coastal guns) was also termed as a battery (see: *Air Ground Operations Battery*, *Combat Service Support Battery*, *Gun Battery*, *Ground Based Air Defence Battery*, *Headquarters Battery*, *Locating Battery*, *Sense Warn and Locate Battery*).
Battery Area	The area into which a battery is deployed. For a gun battery it includes the gun platforms, the command posts (including a second back-up command post), the wagon lines (where the gun tractors (the vehicle that tows the gun and carries the gun’s detachment, ammunition and stores) are located, and the ammunition point (see: *Gun Area*).
Battery Captain	The battery captain (BK) is the second-in-command of the battery and commands the battery gun position on behalf of the battery commander (BC). He is responsible for planning the layout of the gun position and the deployment of the guns upon their arrival. He is also responsible for planning and commanding the position’s local defence (he is referred to as a BK so as not to confuse the abbreviation with that of the battery commander – BC). In a locating battery the battery captain’s duties included that of the operations officer (OPSO) (see: *Second-in-Command*).
Battery Centre	The geometrical centre of all the battery’s guns in the gun position location. All measurements of line (bearing) and range to a target are calculated from this point.
Battery Command Post	The battery command post is commanded by the gun position officer (GPO), a lieutenant, and the second-in-command is the operator command post sergeant (OPCP SGT). Other personnel within the post are operators command post (OPCPs), made-up of junior NCOs and private rank soldiers, and signallers. The command post receives the information to engage targets (eg. the location and altitude of the target) and then calculates the necessary data to be applied to the guns (eg. the bearing and elevation to the target). The command post also records target information and is responsible for survey within the gun area (see: *Gun Position Officer* and *Operator Command Post*).
Battery Commander	The battery commander (BC) is an officer, of the rank of major, who commands a battery. The BC of a gun battery does not deploy with the unit, he deploys with the commanding officer of the infantry battalion that the battery is supporting. The BC is

	responsible for advising the infantry commander with regard to the employment of artillery fire support and may himself call-in artillery fire support. The battery commander of the regiment's headquarters battery is the unit's operations officer (OPSO). (see: *Operational Control*).
Battery Commander's Assistant	An operator command post sergeant who is the second-in-command of the battery commander's party. His duties include checking the battery commander's details, relating to a call for fire support (the "independent check"), before the officer calls-in the fire. The assistant is fully trained in calling-in supporting fire and, when the situation dictates, may carry-out the duties of the BC.
Battery Commanders' Course	The Artillery-related promotion course attended by Artillery captains and temporary majors, to gain the relevant artillery specific qualifications for promotion to major. The course no longer exists. Now officers, from all corps, preparing for sub-unit command attend both a Combat Officers Advanced Course and a Pre-Command Course.
Battery Grid	The survey (fixation and orientation) state of a battery's location taken using basic survey methods (eg. using a magnetic compass and a map resection). Firing information produced by the battery is only relevant to that unit (see: *Regimental Grid*, *Theatre Grid*, *Fixation* and *Orientation*).
Battery Guide	The battery guide (BG), a warrant officer class two, is responsible to the battery commander (BC) on all matters regarding technical gunnery. In action his primary duties include assisting the battery captain (BK) in planning the layout of the gun position and the deployment of the guns upon their arrival. He is responsible for the distribution of ammunition within the battery area and may also be available as a duty officer within the battery command post (BCP). The position is 'junior' to that of the battery sergeant-major.
Battery Headquarters	A gun battery's headquarters is made-up of the battery commander (BC), the battery captain (BK), the battery sergeant-major (BSM) and the orderly room clerks.
Battery Leader	The officer responsible for commanding the deployment of a gun battery to a new gun position. During a 'Quick Action' (see: *Quick Action*) the battery leader is responsible to ensure that the call for fire is acknowledged and indicate to the gun group that a 'Quick action' is to occur. The officer is then to plot both the target and gun locations, determine the appropriate direction of fire to the target, deploy the guns in the nearest suitable position, determine the grid of the battery centre (and pass-on this information to the GPO) and lay the guns in the required bearing to the target.
Battery Left	(see: *Battery Right*)
Battery Observation Post	(see: *Observation Post*)

Battery Quartermaster-Sergeant	The battery quartermaster-sergeant (BQMS) is the senior NCO within a battery who is responsible to the battery captain (BK) for the unit's logistics, such as rations, stores and equipment (the rank was a staff sergeant, however, it is now a sergeant rank).
Battery Right	An order for the guns to fire one round at a time, in sequence, from the right-hand most gun across to the left-hand most gun (or from left to right: 'Battery left'). The GPO may nominate to the guns the sequence that the guns are to fire or he may control the firing from the command post by ordering individual guns to fire at the appropriate time.
Battery Sergeant-Major	The battery sergeant-major (BSM), a warrant officer class 2, is the senior warrant officer within a battery. The BSM is the main 'link' between the unit's officers and the other ranks. In action he is responsible for the distribution of ammunition to the gun position (both gun and small arms), the collection of expended ammunition produce (ie. fired cartridge cases) and the disposal of unused charge bags. He also assists the battery captain (BK) with regard to the defence of the gun position and is responsible for any prisoners-of-war taken within the area. He is also responsible for advising the battery commander (BC) on matters relating to the career management of the unit's soldiers, unit discipline, and ceremonial and protocol procedures. He may also be available as a duty officer within the battery command post (BCP).
Battlefield Meteorological System	A stand-alone meteorological system capable of producing computer and ballistic meteorological data for artillery surface-to-service weapons and target acquisition.
Bearing	The horizontal angle along which the ordnance (gun) is aligned to engage a target.
Bearing Picket	Also known as a Survey Picket; consists of a marker driven into the ground with an attached card giving the co-ordinates (grid reference) of the bearing picket and accurate bearings, from the picket, to relevant reference points. The battery director is set-up over the picket and is then orientated using the reference points. A bearing and a distance from the peg can be used to fix the location of a selected gun (see: *Director* and *Aiming Point*).
Bluebell	The radio appointment title for the senior RAEME (Royal Australian Electrical and Mechanical Engineer) member within the unit or at the gun position.
Bombardier	The Artillery's equivalent to corporal. The most junior NCO in artillery was referred to as bombardier, which is derived from an early artillery piece called the bombard (used at the Battle of Crecy in 1346, the first battle in which the English employed artillery). There were problems with the Bombards: at times they could be just as deadly to the detachments as they could be to the enemy, for they were known to blow up as the charge was ignited, therefore the dangerous task of firing the piece fell to the most junior NCO, hence the rank bombardier. The Royal Artillery did away with the rank of corporal in 1920 and replaced it with that of bombardier; the new rank of lance

	bombardier was then introduced. The Royal Regiment of Australian Artillery made the change in 1924.
Bore	The interior of a gun's barrel through which the projectile travels when fired. The size of a gun is often known by its calibre, which is measured across the barrel's lands (eg. 105 mm) (see*: Barrel* and *Lands*).
Box Trail	A rigid structure trail designed in the shape of a hollow box. The piece generally provides sufficient room for elevation within restricted traverse limits (eg. 25 Pounder QF Gun) (see: *Trail)*.
Bracket	Two projectiles, one of which lands over the target (in range) and the other lands short of the target (see: *Target Round*).
Breech	The rear end of a barrel into which ammunition is loaded.
Breech Loading	A gun in which the ammunition (a projectile and separate charge bags) is loaded through the breech at the rear of the barrel. The breech screw mechanism, containing the firing mechanism, is screwed into the breech ring and, when closed, the screw prevents the propelling gases from escaping from the breech when the gun is fired (obturation) (see: *Quick Firing*).
Breech Mechanism	The mechanism, activated by an operating lever, that opens the breech for loading and closes it to withstand the rearward thrust of propellant gases when the gun is fired; it also contains the firing mechanism. There are two basic types of breech mechanism, dependent on the type of ammunition used; breech loading (BL), a screw which also provides obturation when the gun is fired, and quick firing (QF) which has a sliding block.
Breech Ring	The piece attached to the breech-end of the barrel and houses the breech mechanism (see: *Breech Mechanism*).
Buffer	A device that is a component of a gun's recoil system, which absorbs the shock of the gun firing and reduces the strain on the carriage (see: *Recoil System* and *Recuperator*).

C

Calculation of Firing Data

The battery command post (BCP) calculates the map bearing, range and angle of sight between the gun and the target and applies corrections to compensate for non-standard conditions to produce predicted data. The predicted data is then placed onto the sights of the guns and to the projectile's fuze. The corrections applied to the map data are:

* Altitude Corrections.
* Correction of the Moment.
* Drift Corrections.
* Corrections for Rotation of the Earth.
* Non-Standard Projectile Correction.
* Muzzle Velocity Corrections.
* Distribution Corrections.
* Corrections to Fuze Settings.

Calibration

The process whereby the muzzle velocity (the speed the projectile departs the barrel) is determined. This can be by observation of firing, by instruments (eg. an electronic velocity analyser), by measurement of barrel wear or from the number of equivalent full charges fired.

Calibre

The diameter of the bore of the barrel excluding the depth of the grooves (rifling). Barrel lengths are generally expressed in terms of multiples of the calibre.

Call for Fire

The call for Artillery fire to engage a target is made-up of a number of elements and in order to quicken the relevant drills, to minimise delay and to ensure that any mistakes or omissions are readily detected all fire-related orders are given in a set sequence (all orders from the battery command post to the guns are also given in a set sequence for the same reasons). The basic elements for a call for fire from the observer are:

* The observer's identification.
* A warning order.
* The location of the target (including the relevant direction) (see: *Direction*).
* A description of the target.
* The required method of engagement.
* The method of fire and control.

Cancel At My Command

(see*: At My Command*)

Captain-General

The title held by the Monarch. In 1951 King George VI expressed a desire to have the Artillery title of Colonel-in-Chief changed to Captain-General. In 1962 Her Majesty, Queen Elizabeth II became the Captain-General of the Royal Regiment of Australian Artillery (in the Australian

	Army the title is unique to the Gunners). The title originates from 1736, when the rank of Captain-General was replaced by that of Field Marshal.
Carriage	The assembly of wheels, trails, recoil gear and elevating/ traverse mechanisms on which the ordnance is supported and aligned (also known as the 'Basic Structure').
Carrier Shell	A projectile where its 'body' acts merely as a 'vehicle' to carry the payload to the target (eg. smoke, illumination). There are two types of carrier shell – bursting and base ejection.
Cartridge	The propellant explosive contained in a (charge) bag or in a metal case. Cartridges may be classified as 'quick firing' (QF) or 'breech loading' (BL). Quick firing cartridges are usually made of brass and their functions are to provide obturation (when the gun is fired), carry the propelling charge and, fixed into the cartridge's base, a primer. There are three types of cartridges: * Fixed: The case and projectile are permanently 'mated' and loaded into the gun as one piece. * Semi-Fixed: The case is fitted to the projectile before loading; the case contains a number of charge (propellant) bags and any unnecessary bags can be removed before loading. * Separate: The projectile is first loaded into the gun and then the cartridge case is loaded. Breech loading charges (separated ammunition) are contained in a fabric bag and are loaded into the gun's breech after the projectile has been loaded and 'rammed home' into the chamber; a primer is then placed into the gun's firing mechanism.
Cease Firing	The order given by the GPO to bring the guns out of action. Before giving the order to the guns the GPO is to ensure that the order 'Report Guns Empty' has been given to the guns and completed (see: *Empty Guns*).
Cease Loading	An order to stop guns from being loaded; all other actions are continued in accordance with the orders received (ie. guns may still apply previously given orders such as bearings and elevations). Guns that are already loaded may fire but are not re-loaded. The order is cancelled with the order 'Cancel cease loading'.
Centre of Arc	The bearing on which all guns in a unit (eg. a battery or a troop) are commonly aligned when coming into action (ie. deployed). All engagements are then fired from the left or the right of this bearing.
Chamber	The non-rifled, tapered portion at the inside-rear of the of the barrel that receives the cartridge/charge.
Charge	The amount of propellant ordered for a particular engagement (depending on the range to the target). The amount is adjustable for semi-fixed and separate

	ammunition.
Check Firing	An order to stop a gun from firing; all other actions are continued in accordance with the orders received (ie. guns may still apply given orders such as load, bearings and elevations). The order is cancelled with the order 'Cancel check firing'.
Check Map	The GPO's essential 'tool' in conducting independent checks of data produced by the command post personnel and computers. The map records the location of friendly forces (including the observation posts), any 'no-fire' positions, registration points and limits, and possible crest clearance problem areas (see: *Crest Clearance*).
Checking Parallelism	Guns are checked when coming into action (ie. when occupying a position) as soon as possible after the Centre of Arc has been recorded, at 'first light', before 'last light', before engaging a fire plan, after a mistake in line has occurred (but cannot be detected by other means) and following a change of grid involving orientation (see: *Parallelism*).
Chief Instructor	The senior ranking instructor (a lieutenant colonel) at the School of Artillery (see: *Commanding Officer/Chief Instructor*).
Clinometer	An instrument used to lay a gun in elevation. Once a quadrant elevation angle (the angle of sight plus the tangent elevation) is applied, to the clinometer scale, the gun's barrel is elevated until the bubble is level (see: *Gun Rule*, *Quadrant Elevation* and *Tangent Elevation*).
Close Support	The action of the supporting force against targets or objectives which are sufficiently near the supported force to require detailed integration or co-ordination of the supporting action with the fire, movement or other actions of the supported force (see: *Supporting Fire*).
Close Supporting Fire	Fire placed on enemy troops, weapons or positions which, because of their proximity, present the most immediate and serious threat to the supported unit.
Colonels Commandant	Each region within Australia has a Royal Regiment of Australian Artillery (RAA) Colonel Commandant. They are former serving Gunner officers who, during the duration of their appointment, hold the honorary rank of colonel (those who retired at a senior rank retain that rank). The duties of the colonel commandant include: * Fostering *esprit de corps*, the general welfare of the Regiment and its standing in the community. * Giving advice and assistance to the Honorary Head of Corps (HOC) and the Representative Colonel Commandant on (Artillery) Regimental matters, such as customs, history, traditions and memorials. * Acting as the point-of-contact between the RAA Regimental Committee and the various RAA organizations and associations that exist within

	their appointed area. * Participating as a member of the RAA Regimental Committee and advising on the management of the RAA Regimental Fund. * Visiting RAA units within their appointed area and represent the Regiment at appropriate occasions, in accordance with the Regiment's intentions. * Assisting the Representative Colonel Commandant in relation to any other matters of Regimental concern. The senior Colonel Commandant is appointed as the Representative Colonel Commandant (see: *Representative Colonel Commandant* and *Honorary Head of Corps*).
Combat Service Support Battery	A combat services support battery, within an air land regiment, that provides integral combat service support in order to support the defence of deployed forces, and critical assets from air and surface-to-surface missions.
Command	The authority vested in an individual for the direction, coordination and control of a military forces' organization (eg. a division, a regiment, a battalion, a battery, squadron or company, a platoon, a detachment or a section).
Command Post	An Artillery (battery) command post (CP) is the place that receives the relevant orders from the observer (ie. the battery commander, forward observer, forward observer's assistant, or any other person so qualified or authorized) for the engagement of a target. The CP then predicts the necessary data (eg. the bearing, range/elevation, angle of sight and ammunition charge) for the guns to engage the relevant target. The post also calculates the necessary information for the recording of targets. The battery command post consists of a number of operator command post (OPCP) personnel, a sergeant, a bombardier and a number of gunners, and a number of gunner signallers. The regimental command post, which is controlled by the unit's adjutant, coordinates the battery command posts for targets which are to be engaged by more than one battery.
Command Post Duty Officer	An officer (ie. a gun position section commander), a warrant officer (ie. battery sergeant-major or battery guide) or senior NCO (ie. the OPCP sergeant) who temporarily relieves the gun position officer (GPO) and takes command of the gun line's command post (mainly during periods of the night).
Command Post Officer	A gun regiment's adjutant is the command post officer within a regiment's command post, however, the command post officer within a gun battery's command post is referred to as the gun position officer - GPO (see: *Gun Position Officer*).
Command Post Safety Officer	(see: *Gun Position Safety Officer*)

Command Post Shooting Form	A form used in the command post, by the operators command post (OPCPs), to predict the firing data (ie. bearing, range, and angle of sight) to be given to the guns to engage a target. This method is used when not using a computer system (see: *FABS*).
Commander, Royal Artillery	The appointment relates to the senior Artillery officer who commands all of the Gunner elements within the division. Whilst, in reality, it is a British Army term it was also used for the senior Royal Australian Artillery officer within Australian Army divisions.
Commanding Officer	The senior officer within a unit. The commanding officer (CO) of an Artillery regiment does not deploy with his regiment during operations; the CO serves with the brigade headquarters. The CO is responsible for advising the brigade commander with regard to the employment of artillery fire support and he also assumes command of the brigade during the brigade commander's absence.
Commanding Officer/Chief Instructor	The Commanding Officer of the School of Artillery (lieutenant colonel), who is also the School's top ranking instructor.
Commencement of Rifling	The point within the barrel's bore at which the grooves first reach maximum depth and mark the end of the shot seating (see: *Rifling* and *Shot Seating*).
Complete Equipment Schedule	A Complete Equipment Schedule (CES) is all the necessary items carried with an equipment to ensure that it can operate competently. A gun's CES includes items such as spanners, screwdrivers, fuze setters, a rammer, sight testing devices, aiming posts, and an elevation quadrant.
Composite Charge	A multiple charge in which the propellant in at least one portion differs in size and/or shape and/or composition from that in the remaining portions (eg. some of the charge bags within a 105mm cartridge case contain different propellant shapes; some are tubular – each piece has a singular hole through its length, whilst others are multi-tubular – each piece has a series of holes through its length; this gives the piece greater burning surfaces).
Computerised Meteorological System	An automated system for obtaining the meteorological data (eg. wind speed, wind direction, air temperature) to be entered into the command post computer to assist in determining predicted data for the guns to fire on.
Concentration of Fire	Density of fire is proportional to the number of guns simultaneously engaging the targets and their rate of fire. Coverage of the target area is largely dependent upon the number of guns. Therefore, to achieve maximum effectiveness, every effort must be made to quickly concentrate the fire of the required number of guns to cover the target and to order a rate of fire which will give the required density on the target. One round fire for effect from a regiment (three gun batteries) is potentially

	much more effective than three rounds fire for effect from a single battery.
Continuous Fire	The guns fire as quickly as possible (consistent with accuracy and the guns' rate of fire) until further orders are issued. The order may be coupled with a timed interval between the firing of rounds; eg, 'Continuous Fire – 30 seconds'.
Control	An authority, which may be less than a full command, exercised over the activities of a subordinate or other organization (normally for a particular activity and for a set period of time).
Controlled Variable Time Fuze	A Controlled Variable Time (CVT) fuze is an artillery fuze equipped with a system that emits radio signals as the projectile approaches the target. The echo, or return pulse, from the target causes the fuze to automatically detonate the projectile at a set altitude over the target. The altitude that the fuze detonates above the target is pre-set, however, the timing can be 'controlled' by pre-setting a different relevant timing (see: *Mechanical Time Fuze*).
Converge	The guns' lines of sight to the target are converged (ie. the fall of shot from all the guns is directed to a single point).
Correction of the Moment	Information applied to both the bearing and range from the gun line to the target and consists of those corrections which are common to all guns of the unit and for which the values remain true for only a limited period of time. The Correction includes: a. non-standard meteorological conditions for air density, air temperature, and wind speed and direction; and b. non-standard charge temperature. (see: *Meteorological Data*).
Counter Battery	The suppression of enemy batteries either by destruction or neutralisation (formally called 'Counter-Bombardment).
Counter-Battery Fire	Fire directed by the artillery or mortars to neutralize enemy artillery/mortar fire. Also referred to as counter bombardment.
Counter Bombardment	(see: *Counter Battery*)
Cradle	A part of the gun that supports the ordnance and recoil mechanism. On some guns the recoil system is fitted within the cradle or alternatively carried on a sleigh.
Craftsman	The Royal Australian Electrical and Mechanical Engineers (RAEME) equivalent to the rank of private. It is also a term used to describe members of the Corps.
Crater Analysis	Inspection of a crater made by an artillery or mortar projectile to determine the bearing and angle of sight

from which the projectile came and to obtain fragments to allow the determination of the calibre. It is an all arms responsibility but a part of artillery intelligence work.

Crater Analysis Report

A report made after inspecting a crater made by an artillery or mortar projectile. Any fragments of the projectile/bomb that can be collected are labelled with the relevant information, including:

* The time and date at which the projectile was known to have been fired.
* The location at which the fragments were found.
* The direction from which the projectile came (and the method used to deduce this information).
* The name and unit of the person making the report.

Crest Clearance

All officers responsible for the reconnaissance of gun positions are to ensure that all the guns are able to fire over any crests to achieve the line to shoot down to, in low angle, the targets. The GPO is to ensure that all the guns do not fire at an elevation that the projectiles will hit an occupied crest.

Cross-Level

An adjustment made to the gun's sight to compensate for any lack of level of the gun due to the ground upon which it is positioned. If the gun's trunnions are not level, the gun, as it elevates, will also move in azimuth, so upsetting the pointing of the barrel to the target. The cross-levelling gear on the sight will bring the sight upright independently of the level of the trunnions and this will automatically compensate for the movement of the gun's barrel.

Curved Trajectory

The path of the projectile when it has left the muzzle (see: *Trajectory*) is determined by the following factors:

* The muzzle velocity.
* The direction of the line of departure.
* Gravity.
* Resistance of the air.
* The weight and shape of the projectile.
* The spin of the projectile.
* The rotation of the earth.

Cut-off Gear

An automatic adjustment in the control valves of a gun's buffer which shortens the recoil movement as the gun elevates. Cut-off gear is usually found with howitzers and fitted so that the barrel is allowed the maximum length of recoil when the gun is fired in the horizontal position. However, as the barrel is elevated, to fire in higher angles, the recoil length then gets progressively shorter, thereby preventing the breech from striking the ground (see: *Buffer* and *Recoil System*).

D

Daily Ammunition Expenditure Rate	The predicted amount of ammunition, in terms of the required rate of use, expressed in rounds-per-gun per-day.
Daily Sight Tests	The tests carried-out daily at the guns to check for parallelism (see: *Parallelism* and *Sights*).
Danger Close	The engagement of a target that is close to friendly troops.
Data Display Unit	Located at the gun position the unit (DDU) displays the relevant information and firing data transmitted from the command post.
Datum Point	When surprise is required in an offensive operation guns, if possible, do not register the intended targets by firing. A process known as 'silent registration' is undertaken where the necessary predicted bearings and ranges to the targets are provided to the guns by the command post, based on a trigonometrical process; however, this data does not allow for the current meteorological conditions (ie. wind speed and direction, and air temperature). To obtain the relevant meteorological data a datum point is selected, to which both the bearing and range are accurately known. Shortly before engaging the targets the datum point is registered with live-fire, and any changes in the bearing and range to successfully engage the point are applied to the information already predicted for the offensive targets.
Defensive Fire	Artillery fire used to break-up enemy forces attempting to attack the gun position.
Defensive Fire (SOS)	(see: *Defensive Fire Tasks*)
Defensive Fire Tasks	Precautionary targets, selected by an Infantry commander as part of a defensive fire plan, which are sited close to the Infantry position and are intended to break-up an enemy attack. The difference between 'defensive fire' (DF) and 'defensive fire tasks' is that the latter are specifically forecast targets, prepared in anticipation and for which the artillery is forewarned. The most important of a unit's DF Tasks is called the DF (SOS) task and is normally selected to cover the unit's most vulnerable area, or the most likely route of an enemy approach. In delicate situations, the supporting artillery of an infantry unit may lay the guns onto the SOS task when the guns are not actually engaging another target.
Depth of Rifling	The measurement from the top of a barrel's land to the bottom of its groove (see: *Bore*).
Detachment	The gunners who serve an Artillery gun or missile launching system. At times they are also referred to as 'gun numbers', with their particular 'number' defining their duties in action (eg. the detachment commander is the 'Number 1').
Detachment Commander	The NCO that commands a gun/launcher detachment. His responsibilities include ensuring that the correct firing data is

	applied to the sighting system (ie. range and bearing); the gun is laid correctly; the correct ammunition (with the correct fuze and propellant) is loaded and he is responsible for checking for any crest clearance obstacles. He is also responsible that the gun fires at the correct moment in strict accordance with the GPO's orders. He is also responsible for the servicing of the equipment (including carrying-out sight tests) and the training, control and welfare of the detachment.
Detonation	An un-controllable and destructive force. Projectiles detonate when hitting a target or when the time or proximity fuze initiates detonation above a target.
Development of Rifling	The rifling in a barrel develops within the shot seating in a portion known as the development of rifling (see: *Shot Seating*).
Dial Sight	A sight for measuring horizontal angles, thereby laying the gun for line. It consists of a fixed main scale, for laying the gun in the desired initial position (the centre of arc – given by a line from the director), and a slipping scale upon which the bearings to fire-on, to engage a target, are set. It is a removable device that fits into the gun's sight bracket (see: *Centre of Arc* and *Director*).
Difference Altitude	The difference in altitude between two points (usually the gun position and a target).
Direct Action Fuze	A fuze that functions instantaneously on impact with the target.
Direct Fire	Fire with the gun's sight aimed directly at the target.
Direct Support	Artillery units giving direct support to a battle group/unit will give priority to the requirements of that group/unit for fire support; the fire support is normally guaranteed. Direct support units provide forward observers, communications, liaison and advice to the battle group/unit. Direct support units have responsibility for fire planning and the coordination of all offensive support, at every level of command from sub-units upwards.
Direction	A grid bearing, ordered to the nearest 10 mils, of a reference line along which the observer will order target grid corrections, to the gun-line command post, when adjusting fire onto a target (with a laser range finder the direction may be ordered to the nearest one mil). The 'direction' may be ordered using any of the following grid lines: * Line OT (Line Observer-to-Target): This is a direct line from the observer's position to the target. * Line GT (Direction Gun-to-Target): This is a direct line from the gun position to the target. * Any arbitrary, easily distinguished reference line (eg. a prominent road).
Direction GT	(see: *Direction*)
Director	A theodolite-type device (also known as an 'Aiming Circle') which can measure angles in both azimuth and elevation, and is used to lay the guns accurately in the required centre of arc. It

	can also be used for simple survey purposes.
Director of Artillery	The senior officer who is the head of the Royal Regiment of Australian Artillery.
Distribution of Fire	Normally guns fire at a set (common) bearing and range, and the projectiles will then land in the same pattern as the lay-out of the guns at the gun position. However, when required the distribution of the fire can be altered so that the projectiles of all the guns will land at a set location (eg: at one point, or in a straight line).
Drift	Corrections applied a gun's bearing to compensate for the progressive lateral deviation of the projectile which results from the spin imparted by the rifling of the bore (barrels with a right-hand (clockwise) twist impose a drift of the projectile to the right once it leaves the muzzle; therefore the correction to compensate for this is to the left).
Driving Band	All conventional projectiles fired from guns with rifled barrel bores are fitted with driving bands. A soft metal band (generally copper) and it is fitted into the circumference of the projectile towards its rear end; upon firing the band cuts into the lands of the bore. The band has two functions: to impart spin on the projectile and to seal-off the propellant gases behind the projectile, thereby giving uniform ballistics (ensuring all the gases are kept in the bore to drive the projectile) and preventing scoring of the bore due to the escape of hot gases past the projectile.
Droop	The sagging effect on the muzzle of a barrel on its trunnions.
Drop	A correction used by an observer to indicate that a decrease in range along the observer target line (Line OT) is required.

E

Electronic Velocity Analyser	(EVA) An equipment used to measure a gun's muzzle velocity (see: *Muzzle Velocity*).
Electronic Counter Measures	Military action to exploit the electromagnetic spectrum encompassing the search for, interception and identification of, electromagnetic emissions, the employment of electromagnetic energy, including directed energy, to reduce or prevent hostile use of the electromagnetic spectrum, and actions to ensure its effective use by friendly forces.
Elevation	The upwards (or downwards) angular movement of an ordnance upon its carriage to an extent determined by the setting of the sights. The 'quadrant' elevation is the sum of the 'tangent' elevation (a measure of range to the target) and the angle of sight, and is the elevation at which the gun is 'laid'. The 'angle of projection' is the angle at which the projectile actually leaves the barrel after account is taken of 'jump' and 'droop' (see: *Jump* and *Droop*).
Empty Guns	If 'At My Command' is in force and the gun is loaded and laid on a given bearing and elevation, the gun is to fire. Once the gun is fired the detachment commander reports back to the command post 'Number: …. Empty'. If the battery is given the order 'Cease Firing' (see: *Cease Firing*) the command post will first order 'Report Guns Empty'; the detachment commanders then order any loaded rounds and/or charges be un-loaded and then visually check to ensure that their equipment is 'empty'. The commanders then report back to the command post that the guns are empty (ie. "Number: …. Empty").
End of Mission	The order given by the observer to the command post meaning that the mission is terminated (any method of fire already ordered by the observer is completed before the order is passed onto the guns). When the firing is completed the order is passed onto the guns and the gun detachments withdraw from the guns.
Enhanced Position Locating Radio System	Enhanced Position Locating Radio System (EPLRS) is a digital radio used predominantly for transmitting data (eg. it is the bearer which transmits/receives data from the portable surveillance target acquisition radar to the RBS70 detachments and the ground based air defence command post) (see: *Portable Surveillance Target Acquisition Radar*).
Equilibrator	A device on a gun to compensate for any unbalanced weight supported by the cradle forward of the equipment's trunnions.
Equipment State	Reports from the detachment commander to the GPO reporting the current state of the gun; these may include reports about the equipment such as: "Number …. Gun Loaded, Gun Hot", "Number …. Gun Out (coupled with the reason and an estimated time that the gun will be out of action)".

Equivalent Full Charge	Each propellant charge fired causes a different amount of wear to the barrel's bore. A lower charge causes less wear than a higher charge (eg. 105 mm ammunition has seven charges (charge bags) in its cartridge case – if the projectile is to be fired at 'charge three' then the only charge bags used are numbers one, two and three. If the projectile is to be fired at 'charge seven' (the full charge) then all seven charge bags are used). If a gun is fired at 'charge seven' then the gun is fired at 'full charge'; if it is fired at a lower charge it would take a number of these firings to equal the wear of a full charge (hence the term 'equivalent full charge' (EFC)). The number of rounds fired, and at what charges, is recorded in the relevant gun's Gun History Book and this then indicates when a certain number of EFCs have been fired and when a new muzzle velocity check needs to be undertaken (see: *Electronic Velocity Analyser*, *Muzzle Velocity* and *Gun History*).
Equipment	A term to express a whole weapon; the gun, the carriage, the sights and associated gun stores.
Explosive	A 'low explosive' is a controlled and non-disruptive force (eg. propellants explode when set-off within a gun). A 'high explosive' detonates, due mainly to a shock wave, and is a disruptive force (see: *Detonation*).
External Ballistics	The sequence of events which occurs between the moment the projectile leaves the muzzle of the gun and the moment of impact or burst of the projectile (see: *Intermediate Ballistics*).
Extractor	A claw-like metal component at the entrance to the barrel's chamber. When the breech is opened it pulls the fired cartridge case loose from the chamber.

F

Fall of Shot

The pattern made by falling artillery rounds (projectiles) onto a target area (ie. the width and length of the area that the rounds land into) (see: *Probable Error* and *Zone*).

Field Artillery

The arm of Artillery that uses guns designed for mobile land operations and for the delivery of both direct and indirect surface –to-surface fire support.

Previously Australian (surface-to-surface) Artillery units were classified as 'Field Artillery' (eg. 25 Pounder and 105mm guns) or 'Medium Artillery' (eg. 5.5 Inch and 155 mm guns). The term 'Field Artillery' now refers to all surface-to-surface Artillery units, regardless of the calibre of the guns.

Field Artillery Back-up System (FABS)

A command post back-up system to an electronic computer system (see: *Field Artillery Computer Equipment (FACE)*). The items included Tabular Firing Tables, a calculator, Graphic Firing Tables and a Displacement Graph; the relevant information (eg. bearing, range and angle of sight) is then calculated on a command post shooting form (CPSF) and passed-onto the guns.

Each gun applies the given predicted range to its gun rule (which takes into account the gun's muzzle velocity for each charge) to produce the necessary elevation for the gun to fire on.

Field Artillery Computer Equipment (FACE)

A large computer system which was fitted into the back of a Land Rover vehicle or within an armoured personnel carrier. It would produce firing data for the guns, record target information, calculate guns' independent muzzle velocities and deduct survey data.

Field Gunnery Problem

Field artillery weapons must be deployed where they cannot be easily located by the enemy. Although artillery weapons can be employed in the direct fire role the field gunnery problem is principally one of indirect fire. The solution requires data which, when applied to the gun sights and ammunition, will cause the projectile to burst on the target, or at the height required above it.

The problem is solved by a number of basic steps. These are to:

* Determine the fixation and orientation of the guns.
* Determine the location of the target.
* Calculate map bearing, range and angle of sight.
* Convert map data to predicted data to compensate for any non-standard conditions.
* Issue orders to apply to the guns.

Final Protective Fire

A close defensive fire mission where the target is usually located on the approach route most likely to be used by the enemy. The final protective fire (FPF) forms the final barrier of fire assigned to protect the defended position.

Fire Base	A secure base within an area of operations to give the infantry a firm area from which to patrol and it also provides a platform from which artillery and mortar fire support can be employed to support the infantry. There are three types of bases: * Fire Support Base: A secure area from which guns and/or mortars can operate in support of operations. They are normally a reasonably 'permanent' base (eg. in South Vietnam: Australia's Fire Support Base "Horseshoe"). * Fire Support Patrol Base: Bases containing guns and/or mortars that are established and occupied for a limited period of time in support of a particular operation (eg. in South Vietnam: Australia's Fire Support Patrol Base "Coral"). * Forward Operational Base: A firm 'home base' from which aggressive action into enemy-dominated territory can be developed. These bases are made-up of a number of combat units, along with the necessary support units and sub-units, and will normally contain an airfield capable of taking medium-lift transport aircraft. These bases also house the headquarters administration and maintenance areas (eg. in South Vietnam: Australia's Forward Operational Base at Nui Dat).
Fire Control	(see: *Fire Discipline*)
Fire Discipline	The 'language' of fire control involving the observation post, the command post and the guns. It consists of words, phrases, rules and conventions which have specific meanings and result in some definite action at the guns. The aim of Fire Discipline is to ensure that, in response to fire orders, the appropriate action is taken at the guns, strictly in accordance with the intention of the originator and with the minimum of delay.
Fire for Effect	The order for all of the relevant guns to engage a target. If more than one round is to be fired at a target the order will be coupled with the number of rounds that each gun is to fire (eg: 'Six rounds, fire for effect').
Fire Mission	A specific assignment given to a fire unit as part of a definite plan; it may involve one gun, three guns, a battery (six guns), two batteries, a regiment (18 guns), or more (eg. a division's worth of guns). The order 'Fire Mission' is given to alert a unit and to indicate that the following relevant information is a call for fire (eg. "Fire mission battery; (grid reference and map altitude of the target; the line observer-to-target)".
Fire Plan	A plan to concentrate the fire of all the available fire support resources (eg. guns/mortars, etc) onto the relevant targets to best contribute to the success of a tactical plan (see: *Quick Fire Plan*).
Fire Support	The application of artillery fire upon targets as specified by a supported arm commander.

Fire Support Base	(see: *Fire Bases*)
Fire Support Coordination Centre	A formation responsible for planning and coordinating all forms of fire support.
Fire Support Coordination Line	A line established by the appropriate ground commander to ensure coordination of any fire not under his control but which may affect current tactical operations. The Fire Support Coordination Line normally follows well defined terrain features and establishment of the Line is coordinated with the appropriate tactical air commander and any other supporting elements.
Fire Support Patrol Base	(see: *Fire Bases*)
Fire Support Team	A body which forms part of a Regimental Tactical Group that is resourced and qualified to provide control of artillery support, mortar fire, close air support and close combat attack.
Fire Unit	The smallest artillery organization, consisting of one or more weapon systems, and capable of being employed to execute a fire mission (mainly used in air defence units).
Firing Pin	The piece within the breech mechanism that strikes the primer when the gun is fired. This action detonates the primer which, in turn, sets-off the propellant charge. The charges explodes turning into gas, which then pushes the projectile up the barrel's bore (see: *Propellant)*.
Firing Tables	Gunnery Tabular Firing Tables contain a series of mathematical tables listing data for obtaining the necessary elevation and bearing that is to be applied to the gun's sighting system to effectively engage the target. The tables include: * Complementary ranges (non-rigidity). * Temperature and air density corrections. * Wind components. * Propellant temperature. * Corrections for muzzle velocity. * Corrections for the rotation of the earth. * Fuze setting and fuze setting corrections. * Probable error for deflection, and for height of burst, time to burst and range to burst for fuzes. * Angle of descent. * Vertex height.
First Line Ammunition	(see: *Line Ammunition*)
Fitted for Radio	A vehicle which is internally set-up to carry a radio system.
Fitted with Radio	A vehicle which has a radio system set-up within it.
Fixation	The locating of a given point on the earth's surface by map grid references or coordinates with sufficient accuracy for gunnery purposes (see: *Battery Grid*, *Regimental Grid* and *Theatre Grid*).

Fixed Ammunition	The projectile and the cartridge case are 'manufactured' together and the ammunition is loaded into the gun as one piece; the propelling charge cannot be altered (eg. 40 mm (Bofor) Light Anti-Aircraft Gun ammunition).
Flash Spotting	A method of locating hostile artillery by cross observation of the flash produced by the propellant charges on firing. Positions may be located by cross-referencing two or more flash spotting locations.
Forming-up Place	A location at which sections of a unit will meet-up and join together, before moving off as a complete unit to another area.
Forward Air Controller	An officer who, from a forward position, directs the action of combat aircraft engaged in close air support of ground forces (all Artillery forward observers are qualified as Forward Air Controllers (FAC)).
Forward Area Air Defence Command and Control	Forward Area Air Defence Command and Control (FAADC) supports air defence, and counter rocket and mortar weapon systems engagement operations by tracking friendly and enemy aircraft, cruise missiles, un-manned aerial systems, mortar and rocket rounds as identified by radar systems.
Forward Edge of the Battle Area	The foremost limits of a series of areas in which ground combat units are deployed, excluding the areas in which the covering or screening forces are operating, designated to coordinate fire support, the positioning of forces, or the manoeuvre of units.
Forward Operational Base	(see: *Fire Bases*)
Forward Observation Officer	(see: *Forward Observer*)
Forward Observation Party	A Gunnery sub-unit that is attached to another Arm's unit (normally an Infantry rifle company) to call-in Artillery supporting fire when required. The party is made-up of a forward observer, a junior NCO assistant (see: Forward Observer's Assistant) and gunner signallers. Now known as a Joint Forces Team (JFT).
Forward Observer	A forward observer (formally referred to as a Forward Observation Officer) is a Gunnery officer that is attached to another Arm's unit (normally an Infantry rifle company) to call-in artillery supporting fire when required. He is authorized to order supporting fire from his battery, however, unless authorized in advance by the battery commander, the adjutant or the commanding officer, he must request fire support from the regiment's other gun batteries. The forward observer is also responsible for advising the commander, of the unit to which he is attached, on all matters relating to fire support. Now known as a Joint Forces Team (JFT) Commander.

Forward Observer's Assistant	An Artillery junior NCO within a forward observation party. His duties including checking the forward observer's (FO) details, relating to a call for fire support (the "independent check"), before the officer calls-in the fire. The Assistant is fully trained in calling-in supporting fire and, when the situation dictates, may carry-out the duties of the FO.
Fragmentation	The breaking-up of the casing of a high explosive projectile to provide fragments, or splinters, travelling at lethal speeds (inaccurately referred to as 'shrapnel').
Fuze	A device to actuate the contents of a projectile, either along its trajectory (ie. airburst), on impact (percussion), or after penetration of the target (delay).
Fuze Length	(see: *Time Fuze*)
Fuze Setter	A device for setting a time fuze to the relevant time for it to detonate over the target (see: *Time Fuze*).
Fuze Setting	The setting applied to a fuze for its time of detonation (eg. super quick, delay or a time fuze). * A super quick fuze activates the moment it hits the target. * A fuze set to 'delay' will activate 0.5 of a second after it hits the target. * A time fuze will activate at the pre-determined time applied to the fuze's mechanism (see: *Time Fuze*).

G

Garrison Artillery	Artillery units assigned to a base or area for defence operations (eg. Coast Artillery batteries).
Graphical Control Instruments	Command post instruments for manually predicting firing data for the guns to fire on. They included a plotter, a displacement graph, Tabular Firing Tables and Graphical Firing Tables (see: *Field Artillery Back-up System*, *Firing Tables* and *Graphical Firing Tables*).
Graphical Firing Table	A command post device (similar to a slide rule) used in predicting firing data for the guns. Its contents included map ranges and it had a sliding plastic piece onto which current meteorological data was applied; this assisted in turning a map range to a predicted range for the guns to fire on.
Grid Magnetic Angle	The angle measured between the direction of grid north (ie. north on a map) and magnetic north (ie. north on a compass).
Grid North	North as given on a map (see: *Magnetic North*).
Grid Reference	The reference to a position on a map using ‘eastings’ (longitude) and ‘northings’ (latitude).
Grid Square	A square kilometre area marked-out as a square on a map.
Ground Based Air Defence	Land based surface-to-air weapons systems designed to defeat or reduce the effectiveness of hostile air action. Weapon systems may comprise of guided weapons, anti-aircraft artillery or non-lethal weapons, and integral surveillance and target acquisition devices.
Ground Based Air Defence Battery	The role of ground based air defence batteries is to defeat enemy low level air attacks and tactical un-manned aerial systems, targeting designated defence force assets.
Ground Clearance	A procedure undertaken to ensure that friendly fire is not directed into any area occupied by friendly troops or civilians.
Guided Missile Ammunition Technician	A (Royal Australian Army Ordnance Corps) ammunition technician officer (ATO) who is qualified to dispose of malfunctioning guided missiles. There is a requirement to have an ATO present at a firing position during ground based air defence ‘live-fire’ exercises.
Gun	A comparatively long range, high muzzle velocity and low trajectory equipment firing a relatively small projectile (see: *Howitzer*). The term is also loosely applied to describe all artillery pieces (ie. both guns and howitzers).
Gun Aiming Point (GAP)	(see: *Aiming Point*)
Gun Angles	Vertical and horizontal angles that are directly or indirectly, set onto a gun or that are associated with a gun. Vertical angles include:

* Quadrant elevation (see: *Quadrant Elevation*).
* Tangent elevation (see: *Tangent Elevation*).
* Angle of sight (see: *Ballistic Angles*).
* Jump (see: *Jump*).

Horizontal angles include:

* Bearing (see: *Bearing*).
* Switch (see: *Switch*).
* Lead (see: *Lead*).

Gun Area — An area (on operations, or in training exercises) that contains one or more gun positions; an Area may be either battery (normally six guns) or regimental (normally 18 guns) in size. A battery area is commanded by the unit's battery captain (BK) and a regimental area is commanded by the regiment's second-in-command (2IC) (see: *Battery Area*).

Gun Battery — A unit, commanded by a major, consisting of a group of guns, command posts, observation parties, communication groups and supporting administration and logistic sections. In the field the observation parties deploy with the units the battery is supporting (eg. infantry companies, etc).

Gun Data — The information that is passed to the guns, from the command post, for application to the relevant pieces. The data includes bearing, elevation, angle of sight, type of ammunition (including fuze type), fuze setting and charge.

Gun Bays — (see: *Gun Park*)

Gun Detachment — The personnel that serve a gun. The number of personnel within a detachment depends on the size of the piece; however, each member is identified by a number. The detachment commander is the gun's 'Number 1', the layer (the gunner who operates the sights) is the 'Number 3' and the gun's second-in-command is the last number (eg. in a detachment of seven the second-in-command is the 'Number 7').

Gun Display Unit — A target engagement system with a numeric keypad and additional 'acknowledgement keys' which enables the gun detachment commander to transmit fire discipline acknowledgements and digital information (eg. ammunition states and charge temperatures) to the command post.

Gun Drill — The actions carried-out by a gun detachment to bring the equipment into action (ie. the setting-up of a gun to be ready to engage targets) and out-of action, and the actions and procedures to lay, load and fire the piece.

Gun History — A Gun History book is maintained for each gun. It provides a record of wear measurements, repairs and modifications, maintenance and the number of rounds fired by the current barrel (see: *Equivalent Full Charge*).

Gun Laying — The application of the ordered bearing and elevation, and associated drills (eg. re-laying the gun's sights onto the relevant

	aiming point), to a gun to engage a target.
Gun Laying System	A global positioning system receiver used by artillery sound ranging units to locate hostile artillery.
Gun Line	The area occupied by the guns within a gun battery position.
Gun Line Section Commander	(see: *Section Commander*)
Gun Park	The area within a unit's lines where the guns are housed. The guns, when not in use, are kept within the park's gun bays (similar to a garage), and maintenance is also carried-out in this area. Certain elements of gun drill (training) are also conducted in this area.
Gun Pit	A pit dug into the ground (either manually by the gun's detachment and / or using excavation equipment) to conceal or protect the gun and its detachment, from enemy fire.
Gun Platform	The piece of ground onto which a gun is deployed and brought into action within a battery gun position. Some guns have a metal firing platform on which the piece is positioned when being brought into action. The platform makes it easier and quicker, to rotate the entire equipment for large changes in bearings to a target (eg. 25 Pounder and the British 105mm Light Gun (referred to in Australia as the Hamel Gun)).
Gun Position	(see: *Battery Area*)
Gun Position Officer	The gun position officer (GPO) is the officer (a lieutenant) who controls the battery command post. The GPO is responsible for the technical data produced by the command post (CP) for the firing of the battery's guns when engaging targets, for the recording of any relevant targets, maintaining the target records, the circulation to the battery commander (BC) and the forward observers (FOs) information on targets received from other batteries. He is also responsible for maintaining the parallel alignment of the guns; ordering the testing and adjustment of sights (at least once daily and after a redeployment); supervising the daily servicing (maintenance) of the guns; the measurement of charge temperatures; and implementing any change of grid orders and the unit's survey status.
Gun Position Safety Officer	An officer or warrant officer, who is responsible, during training exercises, for checking that the initial information to engage a target (ie. bearing and elevation, or bearing, range and angle of sight) has been correctly applied to gun(s) sights; he also checks that the correct ammunition charge has been selected and if relevant, that the correct fuze setting has been applied. The gun(s) cannot fire the first round of an engagement until the safety officer has determined that the information has been correctly applied and has given the order 'safe'. The safety officer's assistant plots the relevant information (ie. bearing and range) onto a safety map to check that the rounds will not land outside the target safety zone.

Gun Programme	A form issued to guns detailing the necessary relevant data (eg. bearings, elevations, ammunition) for concentration or barrage fire missions.
Gun Rule	A circular (slide rule) instrument, used at the guns, to convert ranges to vertical angular elevations, taking into account the gun's various muzzle velocities. The rule's scale has cursors for each charge, which are set to the gun's current muzzle velocities, and the cursor for the ordered charge is aligned with the ordered range, that is marked on another scale, to produce the elevation to fire on.
Gun Tractor	Any vehicle that tows a gun. It also carries the gun's detachment, its stores and initial supply of ammunition.
Gun Troop	A gun battery's gun troop consists of the gun detachments (including the drivers), the section commanders and the battery guide (BG).
Gunner	The private rank of soldiers in the Royal Regiment of Australian Artillery is 'gunner'. However, all members of the Regiment, regardless of rank, are referred to as 'gunners'. Adding to the confusion, 'gunners' is also the term used to refer to the Regiment as a whole.
Gunners Quadrant	An instrument used for measuring the elevation of a gun barrel. The relevant elevation, for the gun to fire on, is set on the quadrant's scale (marked in mils); the piece is then placed onto the gun's breech block and the gun is elevated until the quadrant's bubble is level; this then indicates that the gun is laid at the correct elevation to engage the target.
Gunnery	The practical application of the science of ballistics to the engagement of targets. It falls into two divisions: firstly, the actual engagement of targets; secondly, the reduction of data obtained by shooting to a form suitable for the eventual engagement of targets.
Gunnery Problem	(see: *Field Gunnery Problem*)
Gunnery Staff	Artillery personnel posted as instructors at the School of Artillery.

H

Handspike

Long wooden, iron-shod levers used to either fit into sockets on a gun's trail(s), to enable several men to lift it, or to go under the trail, to move the trails and thereby move the gun laterally for big switches to engage new targets.

Harassing Fire

The firing of rounds at irregular intervals onto randomly selected targets; the fire is designed to 'annoy' the enemy. Harassing fire is generally delivered by one or two guns, each firing one or two rounds at a time. This type of fire is considered to be both economic and a very effective way of interrupting the enemy's 'daily routine'.

If it is also intended to seal-off an area, at the same time, or to deny the enemy the use of a particular route of approach, the mission is referred to as Harassing and Interdiction Fire (H & I's).

Harassing and Interdiction Fire

(see: *Harassing Fire*)

Head of Regiment

The Artillery's Head of Regiment (HOR) is a senior officer appointed by the Chief of Army to be his principle adviser on Regimental matters concerning the Royal Regiment of Australian Artillery. His duties include:

* Representing the Regiment as the senior adviser for Regimental capability and heritage matters.
* Representing the Regiment at Army and Regimental activities.
* Coordinating Regimental affairs through the Regimental Committee, including acting as Deputy Chairman of the Regimental Committee and participating as an ex-officio or official member, of all other Regimental Committees.
* Conducting Regimental Conferences (which should be held at least biennially).
* Briefing the Army Resource and Capability Management Committee (ARCMC) on capability issues and other outcomes from the Regimental Conference, and to ensure relevant Regimental issues are considered at the Executive level.
* Coordinating Regimental and unit histories matters.
* Promoting the Regiment's customs and traditions.
* Nominating, coordinating and fostering the Honorary structure of the Regiment.
* Maintaining close liaison with the Heads of Regiment of Commonwealth Artillery forces and, when appropriate, with their equivalents in the United States of America.

Headquarters Battery

The support unit within an Artillery regiment which includes:

* Royal Australian Electrical and Mechanical Engineers' Technical Support Troop (TST) / Light Aid Detachment

(LAD).

* Regimental Survey Troop.
* Regimental Command Post.
* Regimental Q Store.
* Regimental Signals Troop.

Height of Burst	The height at which a projectile, fitted with a time fuze, detonates above a target. The accepted height of burst above the target being 20 metres.
High Angle	The elevation in which artillery pieces fire at angles of, or above, 800 mils (45 degrees) and up to 1422 mils (80 degrees).
High Explosive	A chemical compound capable of producing violent shock waves on detonation and which can fragment high explosive projectiles and damage structures.
High Explosive, Anti-Tank	(HEAT) A round used for anti-tank engagements whose projectile has a hollow charge high explosive filling, which, on detonation, can produce a jet of great penetrating power.
High Explosive, Squash Head	(HESH) A round used for anti-tank engagements with the projectile designed to produce a flattened slab of high explosive upon armour. On subsequent detonation, the shock wave blows-off the lethal fragments inside the target.
High Velocity Armour Piercing	A projectile used against armoured vehicles.
High Velocity Charge	A propelling charge which gives the maximum velocity obtainable with the relevant projectile.
Hollow Charge	A hollow (or 'shaped') charge, within a projectile, which is usually cylindrical and with a concave end, that, on detonation, focuses the explosive effect, thereby driving a jet of hot gas of great penetrating power through armour or concrete.
Honorary Head of Corps	The Honorary Head of Corps (HOC) is the advisor to the Chief of Army on Regimental matters connected with the Royal Regiment of Australian Artillery (RAA). His duties include:

* When required, representing the Regiment at Army and RAA activities.
* Being responsible for the coordination of RAA conferences.
* Being responsible for the coordination and fostering of the Colonels Commandant.
* Assisting the Representative Colonel Commandant (see: *Representative Colonel Commandant*) in the coordination of Regimental affairs through the Regimental Committee of the RAA.
* Maintaining close liaison with the Heads of other Commonwealth Artillery and, when appropriate, with their equivalents within the United States of America.
* Being the Deputy Chairman of the Regimental Committee.

	* Being an ‘ex-officio’ member of, or is represented on, all other Regimental Committees.
Hostile Battery	Any number of enemy guns that are controlled by one command post.
Howitzer	Compared to a gun a howitzer is a comparatively short range, low muzzle velocity and high (projectile) trajectory equipment, which fires a relatively heavy projectile (see: *Gun*). It is an equipment that combines certain characteristics of both guns and mortars (eg. a howitzer can fire in both low and high angles (see: *High Angle* and *Low Angle*).

I

Illumination Projectile	An artillery projectile used at night to give night-time illumination over a target area. It is a base-ejection carrier shell that contains an open-ended metal canister, filled with a magnesium compound, which is attached to a mini parachute by means of swivel and wire support lines. When the projectile's time fuze goes-off the gunpowder charge (within the projectile) explodes, which both sets-off the magnesium compound and ejects the metal canister. The parachute then opens and the canister 'floats' down to earth (the average 'illumination time' is about one minute).
Independent Check	The safe, timely, accurate and coordinated delivery of Artillery offensive support is underpinned by the conduct of the 'independent check'. Every effort is made by the relevant originator to have a second person independently check all calculations and data prior to that information being issued, ordered and/or applied. The 'check' is carried-out at the OP parties, within the command posts, and at the guns.
Indirect Fire	Fire that is delivered at a target which cannot be seen by the guns at the gun line.
Indirect Laying	Indirect laying is the most common form of aiming artillery guns onto a target which is not visible from the gun line. The bearing from the centre of the battery position to the target is calculated in the command post and converted into an angle using an aiming point as a reference. The angle (in the term of a 'bearing') is then given to the gun and set onto the gun's sight. The gun is then traversed until the sight points back at the relevant aiming point, at which time the gun barrel is then pointing at the target. The elevation set on the gun is determined from range tables using the calculated range between the gun and target (see: *Aiming Point* and *Elevation*).
Instructor-in-Gunnery	An officer (with the rank of captain) who is an instructor at the School of Artillery.
Intelligence, Surveillance Reconnaissance	An activity which synchronises and integrates the planning and operation of sensors, assets and processing.
Intelligence, Surveillance, Target Acquisition and Reconnaissance	Intelligence, Surveillance, Target Acquisition and Reconnaissance (ISTAR) is a practice that links several battle field functions together to assist a combat force in employing its sensors and managing the information they gather.
Intercommunication Set Gun Control	A land-line intercommunication system between the command post and the guns (often referred to as a 'tannoy'). Fire orders are verbally transmitted to the guns (eg. bearings, elevations, ammunition types, charges, etc) from the command post's gun position officer / duty officer via the Control and are, in turn, acknowledged by the detachment commanders, either verbally, by having the appropriate button on the set pressed, or by using a remote that the detachment commanders had made themselves.

Interdiction Fire	(see: *Harassing Fire*)
Intermediate Ballistics	The sequence of events which occur immediately the projectile leaves the muzzle of the gun (see: *Ballistics*, *Internal Ballistics* and *External Ballistics*).
Intermediate Crests	Crests which are not visible from a gun position.
Internal Ballistics	The sequence of events which occur inside a gun's barrel between the moment the propelling charge is ignited and the moment the projectile leaves the muzzle (see: *Ballistics*, *External Ballistics* and *Intermediate Ballistics*).
Interval	An interval which is the time, in seconds, between the firing of rounds by any one gun. The order may be given with a method of fire for effect (eg. '6 rounds fire for effect – three zero seconds'; this means the gun(s) are to fire 6 rounds with an interval of 30 seconds between each round).

J

Jacket	The outer-tube around all, or part of, a gun's barrel (sometimes referred to as a 'slipper'. It supports and protects the barrel and supplies a means of attachment to the cradle (eg. 105 mm L5 Pack Howitzer). It assists in giving longitudinal and girder strength to the gun, but it plays no part in resisting internal pressure to the barrel (see: *Loose Barrel*).
Joint Forces Team	(see: *Forward Observation Party*)
Joint Forces Team Commander	(see: *Forward Observer*)
Joint Forces Team 2IC	(see: *Operator Command Post*)
Jump	The vertical movement of the gun's barrel due to the shock of firing and which causes the axis of the bore to alter from the angle at which the gun has been laid. Jump is a constant value for a given gun, charge and projectile combination and can be compensated for in the design of the sights, or in the relevant firing tables.

L

Laid	(see: *Laying*)
Lance Bombardier	(see: *Bombardier*)
Lands	The raised portions of the rifling within the bore of a gun's barrel (see: *Bore* and *Rifling*).
Laser Range Finder	A device which uses a laser beam to accurately obtain the range from a position (eg. an Artillery observation post) to a selected target.
Lateral Plane of Sight	The plane which is at right angles to the vertical plane of sight and which also contains the line of sight.
Launch Danger Area	Extends 300m forward of the RBS70 Fire Unit and is 810 mils either side of the centre of the engagement arc to account for the danger of the launch motor separating from the missile.
Launcher Unit	The launching platform for a guided missile system.
Layer	The gunner, within a gun detachment, who is responsible for laying the gun (see: *Laying*).
Laying	When a gun has the relevant line (bearing) and elevation applied the gun is said to be "Laid" (see: *Sights*). There are two methods of laying: * Direct Laying: When the target can be seen from the gun and the line and angle of sight are applied by pointing the sight directly at the target. * Indirect Laying: The line is applied in the form of a horizontal angle from a laying point and elevation is applied in the form of a vertical angle from the horizontal plain.
Lead	A correction applied to the gun's sight which, when engaging armoured vehicles, compensates for any lateral movement of the target during the time of flight of the projectile to the target.
Length of Ram	The distance from the breech face to the base of the projectile when a projectile is loaded into a gun (see: *Shot Travel*).
Lever Breech Mechanism	The lever used to open and close the gun's breech mechanism.
Light Aid Detachment	(LAD) A detachment, within an Artillery unit, of Royal Australian Electrical and Mechanical Engineers (RAEME); in some units it is referred to as the Technical Support Troop (TST).
Light Anti-Aircraft Control Centre	The Bofors 40mm anti-aircraft gun network of ground radar sites, and command and control centres.
Limber	Formally a two-wheeled trailer that carried ready-use ammunition and gun stores; now it refers to any vehicle associated with a gun that carries ammunition.

Line Ammunition	Amounts of ammunition may be held in different locations depending on various demands. The classifications are: * First Line Ammunition: Operational ammunition held and transported by the relevant unit for each gun used by it. The quantity of 'First Line Ammunition' held by the unit depends on the type and intensity of conflict and theatre of operations in which it is involved (the type of ammunition also takes into account that for small arms). * Second Line Ammunition: Amounts of ammunition held in support echelons to replenish 'First Line Ammunition'. * Training Ammunition: Includes operational ammunition (used for 'live-fire' training exercises) and blank ammunition. 'Training Ammunition' is, at times, referred to as 'Practice Ammunition'.
Line of Departure	The direction of motion of a projectile as it leaves the muzzle (it is tangent to the trajectory at the muzzle) (see: *Drift*).
Line Gun-to-Target	The horizontal line from the gun position to the target (often referred to as 'Line GT').
Line GT	(see: *Line Gun-to- Target*)
Line Observer-to-Target	The line of sight from the observer (gun observation post) to the target.
Line to Shoot Down To	The range from the guns to the target.
Line of Sight	The straight line passing through the (gun) sight and the target.
Line OT	(see: *Line Observer-to-Target*)
Live Firing Exercise	A field exercise in which guns fire live ammunition.
Local Crests	Crests which are visible from the gun position.
Locating Battery	A unit that conducts surveillance and intelligence concerned with locating enemy targets, especially guns and mortars, with sufficient accuracy to enable friendly guns to engage them with counter battery fire (see: *Counter-Battery Fire*). The unit also provides survey and meteorological data to, and conducts gun calibration for, the gun batteries. Over time Survey batteries have been made-up of the following sub-units: * Survey Troops. * Flash Spotting Troops. * Sound Ranging Troops. * Radar Troops. * Artillery Intelligence Sections. * Meteorological Troops. * Calibration Sections.
Locating Report	The Locating Report (Loc-Rep) is a serialised proforma used for

	sending the location of a hostile battery (HB) from a locating devise to an Artillery Intelligence Office.
Location Statements	Location Statements (Locstats) are passed hourly when any relevant movement occurs. They are sent to the battery command post and then onto the regimental command post, or to the Headquarters RAA, whichever is the next superior headquarters. All locstats are sent in a numeral code except in the case when report lines have been established.
Lock	A firing device, incorporated in a gun's breech mechanism. They may be a percussion mechanism (manually operated to set-off a primer in a metal cartridge case), or electrical.
Long Gunnery Staff Course	A gunnery course conducted at the British Army's Royal School of Artillery.
Loose Barrel	A homogeneous barrel encased in a jacket (slipper); the jacket extends from the breech to the near the front end barrel (allowing for the muzzle brake to be attached). The barrel is prevented from rotating inside the jacket by screws or dowels. The breech ring is attached to the jacket to hold the barrel firmly in place (eg. L5 Pack Howitzer) (see: *Jacket*).
Low Angle	The elevation in which guns fire at angles below 800 mils (45 degrees) (see: *High Angle*).
Low Angle Fire	(see: *Low Angle*)

M

Magnetic North	North as given by a magnetic compass (see: *Grid North*).
Maintenance Demand	A request for maintenance from Royal Australian Electrical and Mechanical Engineers (RAEME) personnel (see: *Light Aid Detachment*).
Manager Operations Offensive Support Course	(see: *Warrant Officer Gunnery Course*)
Manhole	The radio appointment title for an RSM or a BSM (the term 'Pacestick' is not an official appointment title).
Map Data	The relevant map information from the battery centre to the grid reference defining the target location (see: *Battery Centre*).
Map Range	The horizontal distance from the gun to a point vertically above or below the target. When a range is obtained by firing it is referred to as a 'Reduced Range'.
Map Reference	(see: *Grid Reference*)
Master Gunner	A warrant officer class one who is posted into a technical gunnery and/or instructional position (as opposed to a warrant officer class one in the position of a regimental sergeant-major (RSM)). Prior to early 1981 a warrant officer class one posted into an instructional posting at the School of Artillery was referred to as a senior assistant instructor-in-gunnery (senior Ack IG). In a unit that has both positions (eg. the School of Artillery) the RSM is the senior position (see: *Regimental Master Gunner*).
Master Gunner, St James's Park	The (British) head of the Royal Regiment of Artillery in all regimental matters and the channel of communication between the Regiment and the Monarch (see: *Captain-General*). The appointment is held by a distinguished Royal Artillery senior officer and has an honorary status over all British Commonwealth artilleries.
Mean Point of Burst	The point whose coordinates are the arithmetic average, or the mean of the coordinates, of the separate point of impact of a restricted number of projectiles fired, or released, at the same aiming point under a given set of conditions (see: *Mean Point of Impact*).
Mean Point of Impact	The point whose coordinates are the arithmetic average, or mean of the coordinates of the separate point of burst of a restricted number of projectiles fired, or released, at the same aiming point under a given set of conditions (see: *Mean Point of Burst*).
Mechanical Time Fuze	A fuze which operates by means of a clockwork mechanism and is designed to cause the projectile to function (eg. detonate) before impact.

	Some mechanical time fuzes can also be set to detonate on impact (Mechanical Time Super Quick Fuze – MTSQ).
Medium Artillery	(see: *Field Artillery*)
Met Message	(see: *Meteorological Data*)
Meteorological Data	Information that is essential for conducting predicted fire to successfully engage targets; it enables corrections to be made for the non-standard wind speed, wind direction and temperature. Artillery gun position command posts combine meteorological data with other relevant data for non-standard conditions to produce the correction of the moment. The Data is provided to the gun command posts by way of a 'Met Message' (see: *Correction of the Moment*).
Meteorological Datum Plane	A composition of the temperature, pressure, humidity, wind speed and wind direction at ground level.
Meteorology	The science of the properties and conditions of the atmosphere. Meteorology is very important to ballistics and field artillery gunnery as the conditions of the atmosphere have a considerable effect on the flight of the projectiles.
Meteorology Troop	A unit of Artillery surveyors who provide the meteorology data to the guns, via the gun command post.
Mils	In the Australian Defence Force mils are used for the measurement of angles. There are 6400 mils in a full circle (the equivalent to 360 degrees). In Russia a circle is made-up of 6000 mils.
Minimum Safe Distance	The closest distance to friendly troops that artillery fire can be deployed.
Minimum Safe Fuze Setting	The minimum setting that may be applied to a projectile's time fuze taking into account the location of friendly troops.
Misfire	The detachment commander orders (the number of the gun …) "Misfire" to the GPO when the gun has failed to fire and the appropriate drills have been carried-out.
Missile	A term used loosely for both free-flight or 'ballistic' rockets (ie. those following a ballistic path) and also for guided weapons (eg. a surface-to-air missile).
Mortar	An ordnance solely for high angle fire, normally mounted on a simple carriage, the shock of discharge being transmitted directly to the ground. It is usually a smooth bore, muzzle loaded equipment which fires a fin-stabilised bomb at a low muzzle velocity (there are rifled mortars, but these have never been employed within the Australian Army).
Mortar Report	(MORTREP) A hostile mortar report listing information on the location, type of mortars, etc.
Most Consistent Charge	A charge, which at the relevant selected range, will produce the smallest probable error for range (see: *Probable Error*).

Muzzle	The front-end of a barrel.
Muzzle Brake	A device, attached to the muzzle of a gun, which utilizes escaping propellant gas (when the gun is fired) to reduce the recoil stresses of the gun (eg. 25 Pounder Mk 3, L5 Pack Howitzer, 105mm Light (Hamel) Gun) and the 155mm M198 Howitzer.
Muzzle-loading	Guns/cannons that had the propelling charge and projectile loaded through the barrel's muzzle.
Muzzle Velocity	The measured velocity with which a projectile leaves the muzzle of a gun when fired. The velocity varies for each charge and decreases with wear. There are other factors that affect the velocity, including propellant temperature and different batches of propellant.
Muzzle Velocity Corrections	Corrections made to compensate for the differences from firing table MVs (muzzle velocities), of the relevant gun, and the MV of a particular ammunition batch.
Muzzle Velocity Measuring Device	Equipment for measuring a gun's muzzle velocities (eg. the British made Electronic Velocity Analyser (EVA)).

N

Neglect	The order reported to the observer, by the battery command post, when a mistake is detected on a gun that has just fired.
No Fire Area	An area into which artillery fire cannot be delivered unless expressly authorized as a temporary measure by the headquarters controlling the area.
No Fire Line	Artillery fire may not be delivered short of this line without the approval, or at the request of, the relevant supported commander. However, fire may be delivered beyond the line at any time so long as it does not endanger friendly forces.
Non-Commissioned Officer	A title referring to ranks between that of warrant officer and private soldier (ie. staff sergeant, sergeant, bombardier/corporal and lance bombardier/lance corporal). Staff sergeants and sergeants are referred to as 'senior NCOs' and bombardiers/ corporals and lance bombardiers/lance corporals are referred to as 'junior NCOs' (warrant officers are not referred to as non-commissioned officers) (see: *Warrant Officer*).
Non-rigidity	A figure produced to make corrections to the range to a target that has a different altitude from that of the gun (ie. when the target is above or below the horizontal plain of the gun). Often referred to by gunners as "Up-hill, down-hill shooting".

O

Observation of Fire	Whenever possible the engagement of a target should be observed and, when necessary, the fire adjusted rather than engaging the target by unobserved predicted fire.
Observation Post	A position from which one can view a target and the enemy in general, and from which artillery fire may be directed.
Observation Post Assistant	(see: *Battery Commander's Assistant* and *Forward Observer's Assistant*)
Observation Post Officer	The Observation Post Officer (OPO) mans an observation post and calls-in fire support. However, when these posts are mobile the OPO is referred to as a Forward Observer (FO) (formally called a Forward Observation Officer (FOO)) (see: *Forward Observer*). Now known as a Joint Forces Team Commander.
Observation Post Party	A Battery Commander's Party (BC's Party) and a Forward Observer's Party (FO's Party) are made-up of the observer (the BC or the FO – a captain), an assistant (a sergeant for a BC and a bombardier for an FO) and gunner signallers (see: *Battery Commander* and *Forward Observer*).
Observed Fire	The fire which is adjusted onto a target by the observation of the fall of shot.
Obturation	The sealing of propellant gas, when the gun is fired, within the breech and barrel. The obturation is achieved by the cartridge case (or, when firing separated ammunition, a screw breech), preventing the propellant gases escaping to the rear of the barrel, whilst the projectile's driving band prevents the gases escaping to the front, over the projectile (see: *Driving Band*, *Screw Breech* and *Separated Ammunition*).
Occupied Crest	A crest which is actually held or may be occupied, or regularly patrolled by friendly troops (see: *Unoccupied Crest*, *Intermediate Crests* and *Local Crests*).
Offensive Fire	Fire, delivered by supporting units, to assist and protect a unit that is engaged in an offensive action.
Offensive Support	The fire assets that are available for an offensive support operation; these include artillery, mortars, attack aircraft and naval gunfire support.
Officer-in-Charge	A commissioned officer, warrant officer or a non-commissioned officer temporally in charge of a party for a particular task.
On-Call Target	A planned target, other than a scheduled target, on which fire is delivered when called for.
Operational Command	The authority granted to a commander to assign missions, or tasks, to subordinate commanders, to deploy units, to re-assign

	forces, and to retain or delegate operational and/or tactical control as may be deemed necessary (see: *Command*).
Operational Control	The authority granted to a commander to direct forces assigned so that the commander may accomplish specific missions or tasks, which are usually limited by function, time, or location; to deploy units concerned, and to retain or assign tactical control of these units (see: *Control*).
Operations Officer	(see: *Battery Captain* and *Second-in-Command*)
Operator Command Post	A soldier (ie. one of a private rank or an NCO) who works within a unit command post. The duties include predicting fire data for the guns to engage targets, target reduction data for target records and acquiring the relevant battery survey status (normally referred to as either an OPCP, an OPCP BDR (bombardier) or an OPCP SGT (sergeant). The position was formally referred to as a Technical Assistant, Royal Artillery (TARA), and the title is now an Artillery Command Systems Operator. Operator command post NCOs are also assistants to battery commanders (BC's Ack (assistant) and forward observers (FO's Ack); however, the title is now a Joint Forces Team 2IC (second-in-command).
Order of Battle	The identification, strength, command structure, and disposition of the personnel, units, and equipment of any military force.
Ordnance	The gun's barrel, breech and firing mechanisms. It is also a collective noun for artillery pieces.
Orientation	The alignment of the director and other horizontal angle instruments, by reference to grid north, with sufficient accuracy for the necessary purpose (see: *Director*). Initial orientation, on arrival at a new gun position, is determined within the battery area by magnetic compass or map measurement, and then subsequently improved by the survey processes.
Over	A projectile which falls beyond the target (in range) as seen from the observer (see: *Short* and *Target Grid Corrections*).

P

Pack Howitzer	A howitzer which can be dismantled for transportation (eg. the 105 mm L5 can be broken-down into 25 separate pieces).
Panoramic Sketch	A drawing or pictorial representation of the view from an OP (see: *Observation Post*). It is a means of indicating the view that can be seen from a particular OP; an aide to an Artillery commander in the indication of targets for observed fire to his subordinates; and an adjunct to a shooting map (see: *Shooting Map*).
Parallelescope	A long-rectangular shaped mirror, placed upon a tripod, which is placed a few metres from the gun. Once a bearing is placed on the dial sight the layer then traverses the gun and aims his sight onto its reflection in the mirror.
Parallelism	All the guns, within a battery, in line with each other with regard to their orientation.
Petroleum, Oils and Lubricants (POL)	All the necessary and relevant petrol, oils and lubricants carried by a unit for the operation and maintenance of both its vehicles and its guns.
Plane of Departure	The vertical plane containing the line of departure of a projectile (see: *Line of Departure*).
Platform	(see: *Gun Platform*)
Point of Burst	The point where the projectile bursts, if it does so before impact.
Point of Impact	The point where the projectile hits an object which ends its flight.
Polar Coordinates	Coordinates produced by combining direction, distance and the vertical angle to a point.
Portable Surveillance Target Acquisition Radar – Extended Range	A tactical mobile advanced alerting target sensor, with a 40 kilometre range and a 4.5 kilometre ceiling. It can distinguish between fixed-wing and rotary wing threats.
Position and Azimuth Determining System	Position and Azimuth Determining System (PADS) carries fixation from a survey control point to where it is needed. Subsequently, orientation can be taken from the system using a director that is laid on a mirror that forms a part of the PADS case and aligned with the axis of the gyro platform (see: *Survey Control Point*).
Predicted Data	Information obtained by applying the corrections required to compensate for local prevailing non-standard conditions to a target's map data. The process of determining and applying such corrections is called 'prediction'.
Predicted Fire	The data supplied to the gun for it to fire on. It takes into account the necessary corrections for the prevailing meteorological conditions, difference in altitude (between the target and the gun), charge temperature, time of flight, drift, muzzle velocity,

	and rotation of the earth.
Predicted Horizontal Range	The predicted range to a target by adding the projectile correction factor to the standard predicted horizontal range; this is the range needed to hit the target (on the same horizontal plane) with the ammunition currently in use under the prevailing conditions (see: *Projectile Correction*).
Predicted Line	The bearing to hit the target, under the prevailing conditions, with the projectile in use. It is found by adding corrections for drift.
Predicted Range	The range required to hit a target, under the prevailing conditions, that is on a higher, or lower, horizontal plane to the gun. It is found by adding the non-rigidity correction to the predicted horizontal range (see: *Non-rigidity*).
Premature	A projectile which detonates before reaching its target. There are three types of premature: * Bore Premature: Where the projectile detonates within the (barrel's) bore. * Muzzle Premature: Where the projectile detonates within 100 metres of the gun's muzzle. * Inflight Premature: Where the projectile detonates somewhere along its trajectory, but prior to arriving at the target.
Preparatory Fire	Intense pre-arranged artillery fire delivered in accordance with a time schedule and in support of an attack, for the purpose of disrupting the enemy's communications, disorganizing its defences and neutralizing its fire support means. Preparation fire may start prior to, at, or after H-hour and continue until it is lifted either on a pre-arranged time schedule, or on request from the assault forces.
Prepare to Move	The order for the relevant preparations to be made to leave the current position. The guns remain in action (ie. ready to fire any missions that may be ordered) until the order 'Cease Firing' is given by the GPO (see: *Cease Firing*).
Primary Arc	The main arc of fire for a fire unit.
Primer	The piece at the base of a cartridge case (or within the breech block for separated ammunition) which, when struck by a firing pin, ignites the ammunition's propelling charge (see: *Separated Ammunition*).
Probable Error	The error, or standard deviation, which produces a dispersion pattern of the projectile at the target (when firing on the same data) in range, line, height of burst, time to burst and/or range to burst. It is estimated that at least 50 percent of the fired rounds are likely to fall onto the target (see: *Zone*).
Projectile	The piece of ammunition consisting of a shell and fuze. When fired from the gun, by the applied exterior force of the propellant, it continues in motion by virtue of its inertia (see: *Round* and *Shell*).

Projectile Correction	The correction that takes into account allowances for any differences between the projectile to be fired and the standard projectile. This includes corrections for non-standard weight and the fuze (see: *Predicted Horizontal Range*).
Proof	(see: *Proof and Experimental Establishment*)
Pronto	The radio appointment title for a signaller (eg. the battery signal sergeant).
Proof and Experimental Establishment	The testing of guns, by firing, before they are accepted into service, is conducted at the Proof and Experimental Establishment (P&EE). The Unit establishes whether the relevant guns are safe to be fired under set-down Service conditions and can operate within the required specifications. All barrels, breeches, buffers and recuperators, and, in some cases, complete guns are test fired. The Unit also tests, by firing, samples of ammunition before they are accepted into service. Projectiles, fuzes and cartridges are tested at various stages of manufacture to ensure that they function both correctly and safely.
Propellant	A relatively slow burning low explosive that, when fired, turns into a propellant gas which then propels the projectile up and out-of the gun's barrel (see: *Charge* and *Firing Pin*).
Proximity Fuze	A fuze designed to cause a high explosive projectile to detonate in the air (above a target) (see: *Fuze*).

Q

Quadrant Elevation	The vertical angle between the horizontal plane of a gun and the bore of its barrel when laid to engage a target. It is a combination of the tangent elevation and the angle of sight (see: *Angle of Sight*, *Laying* and *Tangent Elevation*).
Quadrant Fire Control	A device to which the gun's relevant elevation (in mils) is applied. The gun's barrel is then elevated until the quadrant's bubble is central, meaning the gun is now set at the required elevation for range to the target. It is generally used for Danger Close missions or when a gun's elevation equipment is damaged (see: *Elevation* and *Danger Close*).
Quick Action	A fire mission that is ordered whilst the unit is on the move (eg. moving to a new gun position). All vehicles stop at the nearest appropriate area and the guns are then immediately brought into action at this position. The first gun to report 'Ready' is directed into the centre of arc by a section commander using a prismatic compass; this gun then passes line to the remainder of the unit's guns, when they are in action, so all the guns are parallel (see: *Parallelism*).
Quick Fire Plan	A quick fire plan, originated at a battalion or lower level, that supports an isolated attack (see: *Fire Plan*).
Quick Firing	A system of obturation which seals the gun chamber upon firing. When the gun is fired the resulting heat and pressure of the propelling charge expands the upper-end (opening) of the cartridge case and thereby prevents any of the gas escaping out through the breech and, as such, all of the gas is directed to propelling the projectile up the barrel (see: Breech Loading).
Quick Sight Tests	Tests of gun sights for parallelism carried-out when daily sight tests are not practical, on coming into action in a new gun position, during any pause in prolonged firing, on resting guns during long fire plans and when required as a part of the 'Verify Mistake' procedure.

R

Rammer	A tool used by gunners to ram home, into the breech, separated ammunition projectiles (see: *Separated Ammunition*). A number of today's guns incorporate automatic powered rammers.
Range	The distance between the battery centre and a target.
Range Finder	An instrument used to determine the distance between an observer and the target.
Range Tables	A series of mathematical tables showing ballistic data (such as the elevation required for a particular range).
Ranging	The procedure to ascertain the range and bearing to a target by observing trial shots, after obtaining rough data from a map (see: *Adjustment*).
Rapier Control System	A component of the Rapier Optical Tracker from where the operator can remotely control the functions of the weapon system through a series of switches, buttons and dials. The fire button of the Rapier Fire Unit was located in the Control System.
Rapier Fire Units	The fire units of the complete Rapier weapon system, which include the launcher, the optical tracker and an optional DN181 radar tracker (for a 'blind fire' capability).
Rate of Fire	The named rates of fire, in rounds-per-minute, that a gun may be ordered to fire (if required). The relevant numbers vary with different types of guns. The named rates are: * Intense. * Rapid. * Normal. * Slow. * Very Slow.
Ready	The term used when a gun, or a group of guns (eg. a gun battery), is set-up ready to engage targets.
Reciprocating Sight	A gun sight that is capable of being cross-levelled to compensate for any lack of level of the gun's trunnions (see: *Cross-Level*).
Recoil	The rearward movement of the gun's ordinance (ie. barrel, breech and firing mechanisms) upon the gun being fired.
Recoil System	Equipment that absorbs the energy and shock of the gun firing by gradually checking and finally stopping the rearward movement of the recoiling ordnance. Its major components are the buffer and recuperator (see: *Buffer* and *Recuperator*).
Record as Target	An order from the observer to the command post (given before the order 'End of Mission') that the grid reference of the engaged target is to be recorded.

Recuperator	A part of the recoil system which returns the ordnance, after firing, to its former position (ie. it provides 'counter-recoil' to return the ordnance to the 'in-battery' position, or pre-firing position).
Reduced Range	(see: *Map Range*)
Reduction	The process by which map coordinates are derived for a registered target. Variations for non-standard conditions are removed to give map data, from which the target location is calculated by bearing and distance (this procedure is used in formulating target record information at the completion of a fire mission, if so ordered) (see: *Target Records*).
Reference Line	A line marked on the ground in such a way that a director may be set-up on it and angles can be measured from it to other objects from the direction defined by the line. The line can be marked by two or more aiming posts placed in the surrounding area in which the director is to be used (see: *Aiming Posts* and *Director*).
Reference Object	A point from which horizontal bearings can be taken. This can be: * A point to which a bearing has been determined. * A point to which the angle from the centre of arc, or the bearing of fire, has been measured and recorded. * A point selected from which to measure angles to other points in a round of angles. * Any point to which the bearing is known. (see: *Centre of Arc* and *Reference Line*).
Regiment	An Artillery regiment is generally a 'battalion' sized unit made-up of a number of relevant sub-units. However, all Australian Artillery regiments belong to the Royal Regiment of Australian Artillery, commonly referred to as 'The Regiment' (see: *Royal Regiment of Australian Artillery*).
Regimental Command Post	A unit's regimental command post (RCP) is commanded by the commanding officer, however, the regiment's 2IC (second-in-command) is responsible for the command post's deployment, defence and administration. The RCP is the unit's tactical chain of command and is responsive to fire orders from the commanding officer, the battery commanders and observers, as well as from higher artillery headquarters (see: *Adjutant* and *Regimental Fire Missions*).
Regimental Fire Missions	Fire missions involving more than one of the regiment's gun batteries. Adjustment onto the target is undertaken by one of the batteries and then all the batteries take-part in the engagement of the target.
Regimental Grid	A common geographical grid (for fixation and orientation) shared by all the gun batteries within an artillery regiment (see: *Fixation*).

Regimental Headquarters	The headquarters of an artillery regiment consists of the commanding officer (CO), the second-in-command (2IC), the adjutant and the regimental sergeant-major (RSM). All other headquarters staff personnel (eg. the chief clerk, signallers, drivers, etc) are technically members of headquarters battery.
Regimental Master Gunner	The warrant officer class one (WO1) within the Directorate of Artillery. His role includes giving advice to the Director on matters relating to technical gunnery and on matters with regard to the postings and career management of the other ranks (ORs).
Regimental Officers' Basic Course	A course conducted at the School of Artillery for graduating officer cadets before being posted to a regiment or a battery. The Course teaches the new officers the necessary training to enable them to carry-out such duties as a section commander, a command post duty officer and a survey officer (formally titled a 'Young Officers' Course).
Regimental Officers' Gunnery Course	The Artillery-related promotion course attended by Artillery lieutenants to gain the relevant gunner qualifications for promotion to captain.
Regimental Quartermaster-Sergeant	The regimental quartermaster-sergeant (RQMS) is a warrant officer class one who is employed within the regimental quartering store (Q Store).
Regimental Sergeant-Major	The regimental sergeant-major (RSM) is a warrant officer class one and is the senior other ranks member of a regiment and is the main 'link' between the officers and the other ranks, within the regiment. The RSM implements the second-in-command's ammunition resupply plan (for both gun and small arms) within the regiment (which includes the distribution of ammunition to the batteries). He also assists in establishing the regimental headquarters and its local defence. The RSM advises the commanding officer on all matters relating to discipline, and ceremonial and protocol matters within the regiment. He also controls the regimental police and is initially responsible for any of the unit's prisoners-of-war. The RSM may also be available as a duty officer within the regimental command post (RCP).
Regimental Signal Officer	The Regimental Signal Officer (RSO) is the commanding officer's advisor on all technical communications matters. The RSO supervises the standard of fire discipline, voice procedure and artillery fire orders on the regimental radio nets. When not engaged in these technical duties the officer is available as a duty officer in the regimental command post.
Regimental Survey Officer	The Regimental Survey Officer is responsible for producing a survey plan to put the guns of the regiment on the specified survey grid by the 'time to be ready' as laid down in deployment orders. The officer maintains close liaison with any survey report centre or elements of the divisional locating battery in his area, to ensure that data for any necessary change of grid is available to him at the earliest possible moment. At times the officer may be responsible for the survey of sub-units other than those of his

	own regiment, in accordance with the overall survey plan within the formation. The officer may be required to provide survey data for observation posts or targets.
Registration Mission	A method, with the firing of guns, to obtain the relevant metrological data when a meteorological message is not available (ie. information relating to air temperature, wind speed and direction, etc).
Registration Point	A datum point of a known grid reference on theatre grid (see: *Theatre Grid*).
Rendezvous	The location at which tactical parties or units are to gather for orders, reconnaissance, movement or deployment.
Repeat	The order is used only between an observer and the command post. It has the following meanings: * During 'Adjustment of Fire': Another round is fired at the previous fired line and elevation. During 'Battery Right/Left' adjustment the order may be coupled with target grid corrections, alterations to the number of guns to fire, the interval and/or the type of ammunition. * During 'Fire for Effect': The same number of rounds, at the same method of Fire for Effect, are to be fired again. The order may be coupled with alterations to the number of guns, gun data, interval and/or ammunition. However, if the number of rounds or method of Fire for Effect is changed then the order (Repeat) is not to be used.
Report Guns Empty	(see: *Empty Guns*)
Representative Colonel Commandant	The Representative Colonel Commandant is the senior Colonel Commandant (see: *Colonel Commandant*) and his duties include: * Representing the Regiment on such occasions as may be necessary, in accordance with the Honorary Head of Corps' (HOC) intentions (see: *Honorary Head of Corps*). * Being the channel for communications between the Regiment and the Master Gunner St James's Park, on appropriate matters (see: *Master Gunner, St James's Park*). * Maintaining liaison with the other Colonels Commandant and coordinate their activities on Regimental matters. * Being the Chairman of the RAA Regimental Committee and other committees as may be appropriate. * Periodically visiting Royal regiment of Australian Artillery units.
Rest	The order is given by the GPO when fire is to be temporarily suspended; no actions are taken by the detachment(s) on the receipt of any orders whist 'Rest' is in force and the detachments remain at their positions in action. The order is cancelled by either 'Cancel Rest' or a fresh mission (eg. 'Fire Mission …').
Rifled Breech Loading	A gun with a rifled barrel that has the round loaded through the breech.

Rifled Muzzle Loading	A gun with a rifled barrel that has the round loaded through the muzzle.
Rifling	Spiral grooves cut into the bore of a gun barrel to grip the projectile's driving band, when loaded, and to impart rotation (spin) of the projectile, when the gun is fired, as it passes-up the barrel (see: *Driving Band*).
Robotic Bofors System	The RBS 70 ground based air defence weapon system.
Rocking Bar	A basic sighting system by which the gun's sight bracket is tilted forward, by the desired elevation, and then brought-back to the horizontal position by elevating the gun's barrel, which then will have the correct quadrant elevation (for range) applied.
Round	An artillery round is ammunition comprising of the projectile (shell and fuze) together with a propellant and primer. When the propellant is in a (metal) cartridge case the case is either 'fixed' to the projectile (ie. the charge cannot be adjusted and the case cannot be removed from the projectile); 'semi-fixed', the case is attached to the projectile before loading into the gun; or 'separate', the projectile and the case are loaded separately. With 'separated' ammunition the round is the projectile and the propellant is in charge bags (without a cartridge case) and the charge bags are loaded into the breech after the projectile (see: *Projectile*).
Round of Angles	The process used in artillery survey of relaying on the relevant reference object after measuring horizontal angles in order to ensure that the director's reading scale has not moved and that additionally its lower plate has not been disturbed (see: *Director* and *Reference Object*).
Rounds Complete	The order reported by the battery command post to the observer, and by the detachment commanders to the GPO, on the completion of any method of 'Fire for Effect' (except when a single gun fires a single round).
Rounds per Gun	The number of rounds each gun is to fire during a particular stage of a fire mission (eg. 'Six rounds fire for effect' means each gun fires six rounds (see: *Fire for Effect*).
Rounds per Minute	The number of rounds a gun (or guns) is to fire in a minute and the order is given to the gun(s) with a time spacing (eg. to fire five rounds in one minute the order given to the gun(s) would be: "Five rounds fire for effect; one-zero seconds").
Royal Australian Electrical and Mechanical Engineers	(RAEME) The Corps that supports Artillery units with regard to the maintenance and repair of its equipment (eg. guns, rifles, radios, missile launchers, radars, vehicles, etc). All Artillery units contain a RAEME sub-unit.
Royal Regiment of Australian Artillery	The correct title of the Australian Army's Artillery; generally shortened as 'Royal Australian Artillery' (RAA).

Rules of Engagement	Directives, issued by the relevant military authority, that specify the circumstances and limitations and/or the continuation of combat engagement with other forces that are encountered.
Run Out	The position of a gun's barrel prior to firing and following recoil after the gun has fired (see: *Recoil*).

S

Saddle	The part of a gun carriage that enables the super-structure to pivot on the lower portion of the carriage (see: *Basic-structure*).
Safe Target Area Adjusted for Meteorological Conditions	Applying the effect of meteorological data onto a plotted safe target area to determine whether-or-not a call for fire, onto a particular target, will still fall within the relevant safe area.
Safety Officer	(see: *Command Post Safety Officer*)
Scheduled Target	A planned target on which fire is to be delivered at a specified time.
Screw Breech	A form of breech that operates by the engagement of a screw within corresponding threads in the breech. The obtrurator pad is held around a mushroom-headed spindle passing through the screw (see: *Breech Mechanism*).
School of Artillery	The military establishment where graduating officer cadets and private recruits (on their allocation to Artillery, having completed their officer training and recruit training respectively) attend to learn the basics about gunnery before being allocated to a unit. The School also conducts all the relevant Gunnery promotion and trade courses. The School is made-up of a number training cells, relevant to the various Gunnery branches (eg. field Artillery, air defence, etc) and is commanded by a (lieutenant colonel) Commanding Officer/Chief Instructor.
Seagull	The radio appointment title for the gun position officer.
Second Line Ammunition	(see: *Line Ammunition*)
Second-in-Command	An Artillery regiment's second-in-command (2IC) (a major) is the regiment's operations officer (OPSO) and deputises for the commanding officer in the regimental area. His overall responsibilities include all matters relating to operational command and the deployment of the batteries during a regimental deployment. His duties also include: * Matters relating to technical gunnery. * Communications security. * Co-ordination of local defence. The second-in-command of a gun battery is the battery captain (BK) (see: *Battery Captain*).
Section	(see: *Section Commander*)
Section Commander	The gun line in a battery is split-up into two sections, with the number of the battery's guns equally divided between the two, and each section is commanded by a subaltern (see: *Subaltern*). Within the battery area the section commanders assist the battery captain (BK) by commanding their local defence sectors. The duties of a section commander include:

	* Acting as a duty officer in the battery command post. * Ensuring the maintenance of parallelism between guns. * Supervising the serving of the guns in action which includes the application of fire orders and gunnery data, the distribution and handling of ammunition, and the standard of drill on the guns. * Supervising the deployment and operation of any muzzle velocity measuring equipment within their section. * Supervising the routine servicing of the guns (including regular sight tests) and the maintenance of the ammunition. * Supervising the general administration of their section. The section commander also performs the duties of the battery reconnaissance officer during the reconnaissance for a new gun position, and the battery leader of the main body of the battery in its deployment to the new position.
Self-Propelled	An artillery gun system mounted on a tracked armoured carriage (at times resembling a tank).
Semi-Automatic Breech	A gun's breech which, without intervention from the detachment, opens after the gun has fired and ejects the spent cartridge case.
Semi-Fixed Ammunition	Ammunition which comes in two separate components. The projectiles and the cartridge cases are packed separately but they are connected together before being loaded into the gun/ howitzer (eg. L5 Pack Howitzer / L118 Light Gun).
Senior Instructor	The senior gunnery instructor (an officer with the rank of major) of a wing within the School of Artillery.
Senior Assistant Instructor-in-Gunnery	(see: *Master Gunner*).
Sense Warn and Locate Battery	The battery's role is to defeat surface-to-surface and air threats, and to enable joint air land integration in order to support the relevant deployed force.
Separate Loading Ammunition	The projectile and the cartridge case, containing the (propelling) charge bags are separate. The projectile is loaded into the gun/howitzer, and rammed-home with a rammer; then the cartridge case is loaded into the chamber (eg. 25 Pounder Gun).
Separated Ammunition	The projectile and the propelling charge bags are separate and the charges are not encased within a cartridge case. The projectile is loaded into the gun, and rammed-home with a rammer; the propelling charge bags are then loaded separately into the chamber (eg. 5.5 Inch Gun).
Sequence of Orders	The orders from the observer to the command post, to engage a target, are laid down and given in a set sequence, however, only those orders relevant to the type of mission are given. The orders given to the guns from the command post (which are different to those orders used by the observer) are also in a set sequence, and again, only those relevant to the particular mission are given.

	Within the command post the signaller taking the orders reads back each order, as it is received, as confirmation that the relevant order has been correctly received and understood.
Sergeant-Major Instructor-in-Gunnery	A warrant officer class two gunnery instructor at the School of Artillery. A Regular Army Artillery warrant officer class two posted to an Army Reserve Artillery unit is also referred to as a sergeant-major instructor-in-gunnery. Prior to 1981 the title was Assistant Instructor-in-Gunnery (Ack IG).
Shaped Charge	A shell consisting of a main explosive charge inside the cylindrical body. The front-end of the charge is hollowed-out in the form of a cone which is lined with copper, or other metal, and in front of the cone the shell's shape is continued by a hollow conical head, with a fuze at its tip; the ammunition is used against armour plates. When the projectile hits the target the detonation of the charge is initiated from the base; the detonating wave passes through the explosive and, as it begins to pass around the hollow cone, the cone collapses towards the axis of the hollow. The detonating wave and the gases move forward, in the form of a jet, at a very high speed, to strike through the armour.
Shell	An artillery ammunition shell (projectile) may be solid or hollow, depending on its purpose. Hollow shells may carry high explosive (made to burst on impact or when set-off by a time fuze in flight). Or they may be a carrier base-ejection shell; a time fuze ignites a burster charge which blows-out the base of the shell and ejects the contents (eg. smoke compounds, illuminants, etc) (see: *Carrier Shell*, *Projectile* and *Round*).
Shelling Report	A record of incoming rounds. It includes the time from the primary (the sound of the round being fired) to the secondary (the projectile landing at its target), the location of the observer, the area being shelled, the nature and number of enemy guns/mortars (if possible), the types and number of incoming shells, and the direction/bearing to the suspected enemy position.
Shield	The part of the carriage that provides the gun detachment with a measurement of protection against blast and fragments.
Short	A round which falls short (by range) of the target, as seen by the observer (see: *Over* and *Target Grid Corrections*).
Shot	The order reported to the Observer after firing each round, or group of rounds, in adjustment and after firing the first round of each method of 'Fire for Effect'. The report may be qualified by including the number of the gun(s) that fired (eg. 'Shot 3').
Shot Seating	The portion of the barrel's bore where the chamber diameter is reduced to join the rifled portion. The rifling develops within the shot seating in a portion known as the 'development of rifling' (see: *Development of Rifling*). The commencement of rifling is the point at which the bore's groves first reach the maximum depth and marks the end of the shot seating. The depth of the rifling is measured from the top of the land to the bottom of the

	groove.
Shot Start Pressure	When the propellant charge is ignited gases are evolved and, as a consequence, pressure in the gun's chamber increases until the resistance of the projectile is overcome; the pressure of the propellant then pushes the projectile up the barrel.
Shot Travel	The distance from the base of the projectile up to the barrel's muzzle. When the projectile is rammed into the breech the driving band engages in the shot seating and is deformed to fit the rifled portion of the barrel.
Shrapnel	An obsolete anti-personnel projectile containing a large number of lead balls, which, when the shell detonated, flew-out at a very high velocity (see: *High Explosive*).
Sights	The object of a gun sight is to so relate the axis of the barrel's bore and the sight line, that the trajectory intersects the line of sight at the target. When the necessary data has been set on the sight, the process of setting the bore in the required direction is referred to as 'laying' (see: *Dial Sight*).
Signal Officer	(see: *Regimental Signal Officer*)
Signal Operation Instructions	Communication instructions (SOIs) that change at regular time schedules. They lay-down what relevant frequencies, codes and timings are to be used over a set-down period.
Situation Report	An informal summary of what is currently happening within the operational area. This includes any relevant enemy activities/ actions, and friendly troop deployments and movements.
Slipper	(see: *Jacket* and *Loose Barrel*)
Smooth Bore	A gun (cannon) which has no lands and grooves in the barrel.
Smooth Bore Muzzle Loading	A gun (cannon) with a barrel that has no lands and grooves within the bore, and where the projectile is loaded from the front (muzzle end).
Sound Ranging	A method of locating guns by recording the time intervals of the arrival of sound waves, from the shock of discharge, at an array of special microphones in surveyed positions.
Spades	Devices attached to the rear of the gun's trails to prevent the carriage moving back when the gun fires.
Spin Stabilization	As the projectile moves up along the bore of the barrel, when the gun is fired, the rifling cuts grooves into the driving band (see: *Driving Band*) which forces the projectile to 'twists' as it travels; as such the projectile departs the muzzle with a spin. This spin, in conjunction with the forces of gravity and air resistance, tends to keep the nose of the projectile pointing along the trajectory throughout its flight to the target.
Splash	The order reported by the gun position officer to the observer five seconds before impact, or air-burst, of the incoming projectile.

Split Trail	A gun carriage with two trail legs, each strong enough to withstand full firing stresses, which are joined to a supporting bracket. The legs are locked in the open position when the gun is in action and they are closed and locked together (at the legs' end) for traveling (see: *Trails*).
Stadia Rod	A device used in conjunction with either a theodolite or a director for the measuring of a distance (see: *Theodolite* and *Director*).
Stand Easy	The order is only used on the gun position and is ordered by the gun position officer (GPO) to withdraw detachments from the guns/missile launcher at the conclusion of any action or drill where the order "End of Mission" is inappropriate.
Stand Fast	The order 'Stand fast' may be given by anyone, regardless of rank, when a possible safety breech is detected on the gun line (ie. a breach of safety has occurred or could possibly occur). All action is suspended at once and nobody moves; the detachment commander, or any other relevant person (eg. the BSM or BG), then undertakes the necessary relevant actions to rectify the matter. Once the safety-related problem has been rectified the order is cancelled by the originator, who orders 'Cancel stand fast'.
Standard Ballistic Coefficient	A mathematical formula used to describe the ability of a projectile to overcome air pressure, during its flight to the target, by reason of its mass and shape (the carrying power of the projectile).
Standing Operational Procedures	Standing Operational Procedures (SOPs) are a set of instructions covering those features of operations which lend themselves to a definite, or standardized, procedure without loss of effectiveness. The procedure is applicable unless prescribed otherwise in a particular case.
Standing Orders	Promulgated orders which remain in force until amended or cancelled.
Subaltern	A commissioned officer of either lieutenant or captain rank.
Sunray	The radio appointment title for the commander of a unit or party (eg. the commanding officer, the battery commander, etc).
Super-structure	The gun's mounting, based upon the basic-structure, which includes the barrel, recoil system, recuperator, breech mechanism (see: *Basic-structure*).
Supporting Fire	Fire delivered by supporting units to assist or protect a unit in combat (see: *Close Support*).
Survey	The process of relating guns, observation posts and targets to the map grid reference, essential for predicted fire, or for concentrating the fire of separated gun batteries.
Survey Control Point	The point at which artillery survey usually commences. The 'point' has known coordinates and could be either a trig point, which has been established by topographic surveyors, or by a

	bearing picket which has been placed by artillery surveyors. This 'fix' can be 'carried' by traverse and/or triangulation to a point where an accurate fix is required; this will typically be a battery position or a target acquisition device (see: *Trigonometry Point*).
Survey Officer	(see: *Regimental Survey Officer*)
Survey Picket	(see*: Bearing Picket*)
Survey Reference Point	Trigonometry stations, bearing pickets, and fixation points are all considered to be survey reference points (see: *Survey Control Point*). They are known points having some, if not all, of the following: * Fixation; a location that could be of latitude and longitude and/or coordinates, to a designated degree of accuracy. * An altitude, with a reference to a known sea-level datum. * Directions to identified points, such as a bearing to an easily identified object (see: *Bearing Picket*).
Survey Report Centre	A Survey Report Centre is part of the divisional artillery survey troop headquarters and is commanded by the troop sergeant-major. Its role is the collection, collation and dissemination to user units of all known survey data within the division. As a general rule it physically occupies a central position within the gun areas.
Survey Troop	A sub-unit composed of Artillery surveyors who are responsible for putting the gun line onto an appropriate state of survey for both orientation and fixation. For a battery this is a 'rough' fixation and a common orientation (see: *Battery Grid*); for a regiment all of its batteries are on a 'rough', but common, fixation and orientation (see: *Regimental Grid*).
Switch	A correction to, or angular displacement from, the line to the target.

T

Tabular Firing Tables	(see: *Firing Tables*)
Tactical Headquarters	(see: *Artillery Tactical Headquarters*)
Take Post	The order is used only on the gun position and is given by the command post and/or the detachment commander when the detachment is required to take-up its positions on the gun/missile launcher.
Tangent Elevation	The vertical angle between the axis of the (barrel's) bore, when the gun is laid, and the angle of sight to the target (see: *Quadrant Elevation*).
Tannoy	(see: *Intercommunication Set Gun Control*)
Target Acquisition	The detection, identification and location of a target in sufficient detail to permit the effective employment of weapons
Target Grid Corrections	Target grid corrections are ordered by the observer (as "Left/Right" or "Add/Drop") to get the adjusting gun's round onto the target. All corrections ordered are assumed to be in metres, unless the unit of measurement is otherwise specified (see: *Over* and *Short*).
Targets of Opportunity	Targets which appear during action and can be engaged by ground fire (and/or naval fire, aircraft fire) that had not been previously scheduled.
Target Records	The complete record with regard to a target, including the target's grid reference and altitude (and the accuracy of the reference based on the battery's 'survey level' in place at the time); a brief description of the target; the relevant ammunition information (eg. propellant charge); and the date and time when the information was recorded. Each recorded target has its own (4 digit) number preceded by two letters; the first letter, in all cases, is 'Z', the second letter indicates the level to which the target is held (eg. battery targets - which may only be engaged by the battery that recorded the target; regimental targets – which may be engaged by all the guns within the regiment; divisional targets – which may be engaged by all the guns within the division). The main target letters are: * ZP: A battery target (eg. call-sign 10). * ZQ: A battery target (eg. call-sign 20). * ZR: A battery target (eg. call-sign 30). * ZS: (a battery attached to the regiment). * ZT: A regimental target (one that may be engaged by all the unit's gun batteries). * ZU: A divisional target (one that may be engaged by all of the artillery batteries within the division formation).
Target Round	A projectile which hits the target, as opposed to being either

	over or short of the target (see: *Bracket*).
Technical Assistant, Royal Artillery	(see: *Operator Command Post*)
Technical Support Troop	(see: *Light Aid Detachment*)
Tellurometer	An electronic surveying instrument, used by Artillery surveyors, for measuring distances.
Temporary Position	A position from which guns may fire at a target before occupying the main position in order to avoid disclosing the main position's location to the enemy.
Theatre Grid	Fixation and orientation accurate to the map grid (see: *Fixation* and *Orientation*).
Theodolite	A surveying instrument, used by Artillery surveyors, for measuring horizontal and vertical angles; a more complex and precise piece than a director (see: *Director*).
Time of Flight	The time that a round takes from the time that it is fired to the moment it arrives at any specified point on the trajectory.
Time Fuze	Time fuzes contain either combustion (gunpowder), clockwork (mechanical-time), or variable time mechanisms to measure the time from when the projectile is fired until they initiate the projectile in its flight. This period is referred to as the 'fuze length'. Combustion and mechanical-time fuzes have to have the required length set on them before the round is loaded and fired (see: *Variable Time Fuze*).
Time on Target	The time that a target is to be engaged; guns fire at this time - minus the time of flight (see: *Time of Flight*).
Top Carriage	(see: *Super-structure*)
Top Traverse	The traversing of the super-structure (saddle, barrel, breech, recoil mechanism) without having to move the gun's trails (see: *Basic-structure* and *Super-structure*).
Trails	Rearward members of a gun's basic structure that provide it with stability by absorbing the energy of recoil that is not absorbed by the recoil system and transmitting that energy to the ground. Guns are usually, but not always, towed by the trails. The three types of trails are: * Pole Trail: A single hollow metal tube. * Box Trail: Two long and short members enabling the breech to be depressed between the trails when the gun barrel is elevated to a high angle (eg. 25 Pounder Gun). * Split Trail: Double trail pieces which are connected at the rear for transportation of the gun, but are opened-up, and moved outwards, when the gun is deployed in action.
Training Line Ammunition	(see: *Line Ammunition*)
Trajectory	The ballistic path taken by a fired projectile from the gun's muzzle onwards until its arrival at the target (see: *Curved*

	Trajectory).
Traverse	The left and right movement of a gun's ordnance upon its carriage to an extent determined by the setting of the sights. All traverse on a gun is said to be to the left and right of its centre of arc (see: *Centre of Arc*).
Trials Unit	A unit that is temporarily raised to trial new proposed guns.
Trigonometry Point	An accurately surveyed and documented position, also known as a 'Trig Point', which has been established by topographic surveyors and from which fixation can be taken (see: *Survey Control Point*).
Troop	(see: *Gun Troop*)
Troop Commander	An officer (generally a lieutenant) allocated as being the officer-in-charge of a gun battery's gun troop (see: *Gun Troop* and *Section Commander*).
Troop Sergeant-Major	A warrant officer class two; now referred to as the battery guide (see: *Battery Guide*).
Trunnions	Horizontal cylindrical lugs, or projections, from the gun's barrel or cradle, that provide a pivot point for the elevation/ depression of the ordnance.

T

Tabular Firing Tables	(see: *Firing Tables*)
Tactical Headquarters	(see: *Artillery Tactical Headquarters*)
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Trunnions	Horizontal cylindrical lugs, or projections, from the gun's barrel or cradle, that provide a pivot point for the elevation/ depression of the ordnance.

U

Unit Emplaning Officer	A commissioned officer, warrant officer or senior non-commissioned officer, who liaises with the Air Force with regard to the planning of the layout of a unit's equipment and stores for transportation within a service aircraft (see: *Air Portability Team Leader*).
Unexploded Ordnance	A piece of ammunition which has not detonated or functioned as intended (often referred to as an UXO).
Unmanned Aerial Vehicle	The unmanned aerial vehicle (UAV) that is commonly referred to as a 'drone'. It is an aircraft without a human pilot and is controlled either autonomously, by on-board computer, or by a remote control from a pilot on the ground.
Unobserved Fire	Artillery fire which is brought to bear onto a target without the benefit of preliminary ranging, but as a result of knowledge of the co-ordinates of the gun and the grid reference of the target in association with information concerning the prevailing meteorological and ballistic conditions.
Unoccupied Crest	Any crest which is not occupied by friendly troops (see: *Occupied Crest*).
Un-serviceable	A piece of equipment (eg. a gun, vehicle, radio, computer) which has no further capability for the purpose for which it was designed, or a piece which is deemed to be beyond repair.

V

Variable Time Fuze	A Variable Time (VT) fuze is an artillery fuze equipped with a system that emits radio signals as the projectile approaches the target. The echo, or return pulse, from the target causes the fuze to automatically detonate the projectile at a set altitude over the target. The altitude that the fuze detonates above the target is pre-set and cannot be changed (see: *Controlled Variable Time Fuze*).
Verify	Used between the observer and the command post, or on the gun position between the command post and the gun, when an order/report or the resulting action causes doubt, and is coupled with the details requiring verification. When the data is checked and found to be correct the response is “Correct”.
Vertical Plane of Sight	The vertical plane that contains the line of sight from the gun to the target (see: *Line Gun-to-Target*).
Vertex	The highest point of the trajectory above the horizontal plane through the gun’s trunnions (see: *Trajectory*).

W

Wagon Lines	The area within a battery's position where the majority of its vehicles are deployed whilst not in use (eg. the gun tractors – the vehicles which tow the guns).
Wagon Lines Officer	The officer-in-charge of the unit's wagon lines is the unit's battery sergeant-major (BSM).
Warning Order	An order from an observer, to the relevant unit, requiring Artillery support. The order is normally coupled with the size of the fire unit required to engage the target, or the required number of guns (eg. "Fire mission regiment", "Fire mission battery" or "Fire mission three guns"). It also alerts the unit that all orders relating to the previous target are cancelled.
Warrant Officer	An officer with a Warrant (as opposed to an officer with a commission); the rank structure between commissioned officers and senior non-commissioned officers (senior NCOs). There are three classes of warrant officer: * Warrant Officer Class Two: The rank held by, amongst others, battery sergeant-majors (BSMs) and battery guides (BGs). * Warrant Officer Class One: The rank held by, amongst others, regimental sergeant-majors (RSMs) and master gunners. * Warrant Officer: The rank of the RSM Army.
Warrant Officer Gunnery Course	The Artillery-related promotion course attended by Artillery sergeants to gain qualification for promotion to warrant officer class two. The Course is now named as the Manager Operations Offensive Support Course.
Weapon	A piece that causes damage to a target. Guns, howitzers, etc, are not, technically speaking, weapons; they are the projectors of a weapon. An artillery 'round' is a combination of a propellant and a projectile; the propellant 'fires-out' the projectile (the weapon) which causes the damage to the target.
Weapons Free	The situation when there should be no friendly aircraft in the area. All aircraft may be engaged by (Artillery) air defence units unless they are positively recognized as being friendly. The order is cancelled by 'Hold fire' or 'Weapons tight' (see: *Weapons Tight*).
Weapons Locating Radar	A generic term for all locating radars that are not specifically mortar locating radars (ie. they can also locate guns and rockets).
Weapons Tight	The situation when it is known that there are friendly aircraft in the area. Targets are not to be engaged by (Artillery) air defence units unless they are recognized positively as hostile, or are acting in a hostile manner (as defined in the appropriate 'rules of engagement'). The order is cancelled by 'Hold fire' or 'Weapons

	free' (see: *Weapons Free*).
Wear	The life of a barrel depends mainly on the condition of its bore's rifling as the gas action is concentrated behind the driving band as the projectile moves up the bore when fired (see: *Bore* and *Rifling*).
Wedge Breech	A form of a gun's breech that operates by the sliding of a wedge block in a vertical or a horizontal direction (see: *Breech Mechanism*).
Windage	The difference in size between the external diameter of a projectile and the internal diameter of a gun's barrel. There is some difference between the two, otherwise the projectile would not be able to pass up the bore; however, the size of the 'gap' can be critical to the accuracy and efficiency of the projectile hitting the target. Too much windage means a loss of the propelling gas around the projectile when the gun is fired, thereby resulting in irregular movement of the projectile ('rattling' side-to-side) as it moves up the bore.
Workshops	In Artillery units the workshop is a sub-unit, manned by Royal Australian Electrical and Mechanical Engineers (RAEME) personnel, which carries out the necessary maintenance and repairs of equipment such as guns, rifles, vehicles, radios and computers.

Y

Yaw	The deviation of the axis of the projectile from its theoretical trajectory during flight. In some cases yaw develops because of the loose fit of the projectile in the bore of the gun's barrel and the slight disturbances due to the rush of the propellant charge's gases around the projectile it as it leaves the barrel. In flight the projectile, gyroscopically stabilized, tends to maintain its flight attitude while the trajectory it is following adopts a curve, with the result that the nose of the projectile deviates from the axis of the trajectory. This allows air to strike the nose of the projectile which gives it a deflecting effect that has a tendency to push the projectile even further from its trajectory (see: *Projectile*, *Trajectory* and *Windage*).
Young Officer	A term that was used for a graduating cadet (from a military college) whilst attending a 'Regimental Officer Basic Course', at the School of Artillery, before being posted to an Artillery regiment or battery (see: *Regimental Officers' Basic Course*).
Young Officers' Course	(see: *Regimental Officer Basic Course*)

Z

Zero Line

An imaginary line, expressed as a compass bearing, running roughly up the centre of a battery's projected area of fire. In indirect firing the gun layer lays the gun, for a bearing, by noting an aiming point through the dial sight. If the barrel is pointing up the centre of its projected zone and the sight records zero mils, when laid-on the aiming point, the gun is then said to be laid at zero in the zero line. If a target is to be engaged at a bearing to the left or right of the zero line the layer applies the relevant angle to the sight and then re-lays onto the aiming point; the gun's barrel is then automatically pointing at the target.

Zone

A rectangular pattern on the ground, around the target, into which fired projectiles will fall. For a given elevation a series of projectiles will not fall in the same 'spot', but will be spread around the theoretical impact point in accordance with the laws of distribution and probability.

The 50 percent zone is that rectangle into which 50 percent of the rounds will fall, and is tabulated in the relevant firing tables for every 91 metres (100 yards) of range. The 100 percent zone is four times the 50 percent zone and is that area into which all the rounds will fall.

This means that, with the best information, calculations and equipment, it is impossible to guarantee hitting a precise 'spot' with every projectile all the time and this must be taken into account when determining the range to a target.

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